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### IMMUNITY.<sup>1</sup>

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It is impossible with a subject of the complexity of immunity to attempt to do more in a single lecture than give a very general review of our knowledge and of the state of our understanding of the associated phenomena. Our knowledge since Pasteur began his work has increased apace, but ideas have run riot. The facts have been overlaid with words the intricacy of whose connotations has done much to render the state of our understanding chaotic. Could we but sponge away this mental *débris*, the truth might even now stand stark. The theories of Ehrlich and Metchnikoff were and still are extremely valuable and stimulated the research that has afforded us much of our knowledge, but theories cease to be useful when they are strained beyond their capacity.

Our knowledge of the relationship of bacteria to disease is not much more than half a century old. When one speaks now of immunity one immediately thinks of immunity against bacterial infection or intoxica-

tion. But the phenomenon of acquired immunity was observed in ancient times and even put to practical application in the East long before Jenner in 1796 laid before the Royal Society the results of his experiments on cowpox vaccination. Robert Boyle in the previous century had predicted that the problem of infectious disease would be solved by him who elucidated the nature of fermentation. The work begun by Cagniard-Latour and Schwann and brilliantly carried on by Pasteur realized the prediction. Pasteur with the new knowledge of the relationship of germs to disease, took up Jenner's torch with his work on chicken cholera submitted to the Parisian Academy of Medicine in 1880.

In the consideration of immunity against bacteria these are the two factors to be taken into account, that of the infecting agent and that of the body infected. In the case of both the problem is one of adaptation to environment. Perfect mutual adaptation would result in symbiosis, such symbiosis as is seen, for example, in the heaths which only develop to their adult form if "infected" by a fungus. Biologically the bacteria and man are far apart and will differ in the ultimate structure of their protoplasm and their biological needs, so that the adaptation of bacteria through saprophytism and the various degrees of parasitism to life within the tissues of a human being is an astonishing one

<sup>1</sup> Read at a meeting of the Victorian Branch of the British Medical Association on June 3, 1925.

and it is not perhaps remarkable that the number that succeed is relatively small, nor is it surprising that when successful the lack of adaptation of the invaded tissues should find expression in disease.

As far as the parasites are concerned, the adaptation process may be looked upon, as Welch has pointed out, as an immunization against the defences of the host and upon the nature of the adaptation depends the power of the parasites as incitants of disease, that is their pathogenicity. Great differences in such power exist between different strains of the same organism and fluctuations in pathogenicity can be artificially produced in the same strain. Such variation is probably due to variation in power to produce certain enzymes, but physical expression of adaptation may be seen in some cases in ectoplasmic changes, such as the development of capsules which are probably protective. Further adaptations are the development of resistance to antibody effects and possibly the secretion of non-toxic substances, called by Bail "aggressins," which increase the invasive powers.

The mere presence of even highly virulent pathogenic organisms does not constitute disease. It is a question of balance between the adaptation or adaptability of the organism and the adaptation or adaptability of the body invaded. On this balance and the speed of its development will depend not only the occurrence of disease at all, but its acuteness or chronicity and the final result. Of importance in this connexion also is the number of invading organisms, the path of their introduction and the presence of other organisms which may assist the invaders. The clinical type of disease which will result, depends partly on the nature of the infecting organism and its poisons, partly on their distribution and localization, partly on the balance between virulence and resistance, so that different organisms may produce clinically similar diseases, while one and the same organism may cause entirely different clinical conditions.

In order to understand the reactions which take place in the human body as the result of invasion by pathogenic bacteria, it is necessary to know by what means they produce their disease effects. To obtain nourishment the bacteria secrete enzymes which act on the surrounding substrate, causing cleavage of such material, the products of which may at certain stages be of a poisonous nature. Such poisons, of which ptomaines are the best known, are non-specific and relatively unimportant in bacterial disease. But bacteria also produce specific poisons peculiar to each individual species either secreted or excreted during life or retained in the cytoplasm and only liberated (or possibly developed) after death. The former type, the true or exotoxin, of which diphtheria toxin, first obtained by Roux and Yersin in 1889, is an example, is only developed by a limited number of bacteria. The latter type is that developed by the majority of pathogenic bacteria. The chief characters of the true or exotoxins are these:

(i.) They excite the production of a neutralizing antitoxin when introduced into the animal body. This property distinguishes them from most other antigens and from endotoxins.

(ii.) They cannot be obtained by any chemical process free from protein.

(iii.) They resemble enzymes in that they excite antibodies, are thermolabile, deteriorate on standing and act in small quantities on the substances they attack. They differ from them, however, in that they are bound or neutralized in the process.

(iv.) After injection an incubation time elapses before the appearance of symptoms.

It is to be noted that similar properties are found in the vegetable poisons, ricin, croton and abrin and in snake venom and spider poison.

In the case of the endotoxins it was at first assumed that the poisons were set free during the destruction of the bacterial cells by the natural defensive agencies of the body. This was Pfeiffer's view, but Vaughan has shown that all proteins on suitable cleavage yield products possessing many of the characters of endotoxins and Friedberger found that similar products result also from the action of normal or immune sera on organisms whether pathogenic or non-pathogenic. The mechanism of the poisoning by endotoxins therefore is at present obscure. What seems to be an intermediate condition is the presence of what have been called "X substances" which are more or less closely attached to the bodies of bacteria, but can be removed by washing. This has been observed particularly in the case of streptococci and influenza bacilli. That they are true exotoxins has not yet been established.

The body opposes to the attacking organism an intact surface of skin and mucous membrane bathed with certain secretions. Of the non-specific passive character of this defence I do not propose to speak, nor of the elimination of organisms *via* the liver and bile ducts or the kidney. On penetrating the outer defences, they meet the mobile defences of the body fluids and phagocytes. The resistance met with is the immunity of the body and may be natural or acquired.

Natural immunity may be an attribute of species, of race within the species or of the individual. The species differences between cold and warm blooded animals are easily understood from the temperature requirements of infecting organisms. Species immunity, however, of warm blooded animals is common; disease that occurs spontaneously in one species, either does not affect another at all or affects it to a different degree or in a different manner. Racial differences are also marked. The cause may reside in the peculiar requirements or constitution of the organism causing the disease or in its special adaptation.

Acquired immunity may be passed on in some degree passively from mother to offspring, but natural immunity cannot be passively transferred from one animal to another and must be due to a more fundamental difference in its cellular constitu-

tion, for it cannot be satisfactorily explained simply by the presence of special antibodies in the serum.

Individual differences are still more difficult to explain and the variations in resistance are probably more dependent on environmental factors of nutrition, temperature and so forth than on fundamental cellular differences.

In contrast to natural immunity there is the immunity which a susceptible animal may acquire through suffering from an attack of a particular disease. The immunity conferred varies in different diseases in the case of man. It is lasting in the case of one attack of plague, typhoid, cholera, smallpox, chickenpox, scarlet fever, measles, mumps, typhus *et cetera*. It is not so complete after one attack of pneumonia, influenza, erysipelas, pyogenic coccal infections, tuberculosis, gonorrhœa *et cetera*. In some cases, for example tuberculosis or syphilis, the presence of the organism in the tissues seems to preclude reinfection or at least to increase resistance to reinfection. Jenner and Pasteur used the method of artificial immunization with attenuated viruses. Their experiments were the beginnings of the methods of immunization in which the subject of experiment developed immunity by its own tissue activities, that is, active immunity. The principle of injecting living cultures either attenuated or in sublethal doses of virulent organisms has been variously applied and the efficiency of this method of immunization is much greater than that of the later development, attempts to produce the condition by injections of dead bacteria and bacterial extracts. The use of fully virulent cultures is not unattended with risk. Sensitization by contact with an immune serum has been used to modify that risk and with some success. The use of dead bacteria and bacterial extracts is the logical outcome of Pfeiffer's ideas on endotoxins and the point of interest is the introduction of bacterial protein.

In the case of those organisms which yield soluble exotoxins, the production of active immunity by the injection of those toxins apart from the bodies of bacteria has led to the important discovery of the facts of passive immunity and laid the foundations of serum therapy, which has had its most marked success in the case of the treatment of diphtheria and the prophylactic treatment of tetanus.

The state of acquired immunity is associated with the development of special properties by the cells and fluids of the body. The importance of the phagocytes in immunity has been stressed particularly by Metchnikoff. The lack of complete parallelism between natural immunity and bactericidal or phagocytic power, after Behring and his coworkers had given the lead with their work on diphtheria and tetanus, turned the attention of investigators to the properties of the cell-free blood. The result was the discovery of the development of antibodies, first of antitoxins (including antibodies to vegetable and snake poisons and to ferments such as pepsin and trypsin), later in the search for antitoxins in the case of all bacteria, of antibacterial substances,

bacteriolysins, agglutinins and of precipitins. The study of serological phenomena in association with phagocytosis led to the discovery of opsonins and bacteriotropins. The development of antibodies was soon found to extend beyond that produced against bacteria and toxins. The acquired property of sera of laking foreign red blood corpuscles, due to hæmolysins, led to the investigation of cytotoxins or cytotoxic substances produced in response to the injection of the cells of various organs, spermotoxins, leucotoxins, hepatotoxins *et cetera*. In general the injection of antigens or substances which when introduced excited the development of antibodies, was widely investigated and it was found that they fell into two main groups, those which excite the formation of substances neutralizing the toxic or enzymic properties of the introduced substance and those in which the effect produced is of a more physical nature, lysins, precipitins, agglutinins, opsonins. Except in the case of many organ cytotoxins the reactions are remarkably specific and exceedingly delicate, a fact which has proved of much practical value in various tests based upon them. It must not be lost sight of that, since the cells of the body are responsible for the composition of the blood, the cells themselves must take part in the reaction. Such reactions have been studied in the investigation of anaphylaxis and are of basic importance in the study of immunity.

It is of interest therefore to examine what the antigens have in common. Briefly it may be stated that except for certain observations of Ford on glucosides no antigenic properties have been observed apart from the presence of protein. Certain proteins have been found to have no antigenic value. The most important of these is gelatine, the chief difference of which from other proteins is a deficiency of tryptophane and tyrosin. From his investigations Wells believes that lack of antigenic power is associated with deficiency in aromatic amino-acids in the protein. Other investigators have shown that alterations in configuration and substitution in various groups of the aromatic radicles may alter not only antigenic power but determine specificity, so that specificity appears to be due ultimately to chemical structure. The antigenic property is also associated in some way with molecular size. If digestion of such protein is carried out, the molecule is split into simple derivatives that can be made use of in cellular metabolism. As digestion proceeds antigenic power is lost.

We thus arrive at a chemical conception of the basis of specificity, for since proteins are combinations of amino-acids, even though these be limited in number to some twenty or thirty, an enormous number of different compounds is possible.

Since the production of antibody must ultimately be a result of cellular activity, the site of its formation is of interest. Some experiments with animals seem to show that on immunization there is a greater concentration of antibody in splenic



and lymphatic tissue than elsewhere in the body. Splenectomy, however, does not appear to affect resistance. Other experiments indicate that immunity is locally produced in accordance with the concentration of antigen. Injections into the blood stream produce the highest amount of antibody in the serum. Those into the peritoneum show a higher content in the exudate than in the blood serum. If the infecting agent be localized, for example, in the ear of a rabbit and the ear afterwards amputated, the circulating antibody falls in amount. Clinical evidence in erysipelas suggests the same thing, that the fixed cells of the tissue take an active part in the formation of antibody.

From the facts of the neutralization of toxin by antitoxin Ehrlich, using the analogy of side chains attached to a central nucleus in chemistry, formulated his side-chain theory of the mechanism of immunity. He conceived of three orders of receptors produced by cells according to the nature of the antigen-antibody reaction: those of the first order which attached themselves to toxins and by over-generation and freeing in the blood stream represented antitoxin, those of the second order far more complex molecules, the agglutinins and precipitins and those of the third order requiring the intervention of complement for their function, the lysins.

Ehrlich and his followers regarded the union of toxin and antitoxin as similar to the neutralization of an acid by a base. Experiment showed that this rigid conception could not explain the facts and extensions of the theory with a corresponding multiplication of names were found necessary. Arrhenius and Madsen modified Ehrlich's original conception by regarding the antigen-antibody combination as dissociable or reversible (an idea experimentally supported) and conforming to the conditions of equilibrium under the laws of mass action.

Bordet from his study of the importance of electrolytes on agglutination was struck by the similarity of this and related phenomena to certain colloidal reactions. He propounded the theory that antigen-antibody combinations were colloidal reactions and that the determining factors were those governing adsorption. Since the conditions in the body fluids and indeed in the cell protoplasm itself are colloidal conditions, such a supposition is *a priori* entirely reasonable. The cells are bathed by fluids with which they are in constantly changing equilibrium on account of both external and internal changes. Adaptation is possible only within a certain range compatible with life. They are able to make use of specially elaborated food material from the surrounding fluid. The introduction of abnormal material with which they are not in equilibrium, must result in adjustment or death and the adjustment, as in the case of food materials, must be specific. Moreover, the cell is a continually varying colloidal complex separated into phases and from the exterior by semipermeable membranes composed of mixtures of lipoids and proteins. This fact renders the action on it of substances from without dependent as much

on their physical as on their chemical structure. Antigens are composed of protein complexes of relatively large size and are indiffusible, so that their reactions with cells must be surface reactions.

Loeb's views on proteins and colloidal behaviour, however, bring the chemistry of proteins again into prominence. Proteins act as amphoteric electrolytes. The colloidal particles carry an electric charge and according to the hydrogen ion concentration of the medium in which they are placed, the charge will be in alkaline solution negative, in acid solution positive and at some point between, specific for each particular protein, neutral. On one side of this isoelectric point the protein acts as an acid and on the other side as a base. Red blood corpuscles carry an electric charge depending on the hydrogen ion concentration and it has been shown that the amount of sensitizer or immune body which combines with them, depends on the hydrogen ion concentration. The same is true of bacterial suspensions and their combination with agglutinins.

The similarity of these reactions to those taking place in colloidal solution and between colloids has strengthened the suspicion that these various phenomena of agglutination, precipitation, hæmolysis, complement fixation, bactericidal phenomena, opsonization, anaphylactic sensitization are at bottom one and the same phenomenon. The idea that agglutinins (against injected bacteria) and precipitins (against materials in solutions in which bacteria have been growing) might be the same has existed since they were discovered. Zinsser, however, extends the idea to all these phenomena. Thus antibody *plus* very finely dispersed antigen produces precipitation; antibody *plus* relatively coarse bacterial suspension produces agglutination; antibody *plus* red blood corpuscles in the presence of complement produces hæmolysis; antibody *plus* bacteria will in the presence of leucocytes favour phagocytosis.

In every case, as d'Herelle points out, the result is one of the production of a condition of flocculation or condensation with associated adsorption phenomena. Thus in hæmolysis the antibody alters the colloidal condition of the stroma which is no longer a condition suitable for the adsorption of hæmoglobin and this is in consequence set free. The lysis is a mere dissociation due to the altered conditions. Bacteriolysis he considers does not occur at all. It has only been observed in the case of the cholera vibrio and the assumption that the fragmentation and swelling observed are due to lysis is, according to d'Herelle, based on faulty observation.

The colloidal nature of these reactions is paralleled by the non-specific Wassermann test, in which similar condensation and complement fixation take place on the addition of a mainly lipoidal colloid solution to a serum, the stability of whose colloids has been altered by the adaptation of the body to the presence of the spirochæte, by precipitation tests, such as the Sachs-Georgi and its modifica-



tions, by the colloidal gold, colloidal benzoin and other tests.

The response of the production of antibody is in every case a response to the presence of foreign protein. The formation of antibody may be regarded as the expression of cellular reaction against such protein and the coagulation resulting may be looked on teleologically as a preparation for phagocytosis or digestion by ferments and the ultimate elimination of the foreign protein. But that the cells of the body themselves are affected by the alterations in the equilibrium of its colloids and those of the blood is witnessed to by the phenomena of anaphylactic shock.

Here again the agency producing the condition is a protein, often in insignificant quantity, which will cause, after an interval of some days, a condition of sensitiveness to a subsequent injection. It has been conceived that this reaction may be due to a toxic compound formed by the union of antigen and antibody or to toxic results from proteolysis resulting from such reaction. But the toxic results may be brought about by adding any kind of bacterium to fresh serum. Bordet obtained the same result by adding agar to fresh serum. The essential thing appears to be the addition of some colloidal material.

Mademoiselle P. Mendéléef has examined this phenomenon and her findings are interesting. She determined the concentration of hydrogen ions in fresh serum and the effect on them of adding agar suspension. The result was a great increase in the concentration of hydrogen ions and with the change towards the isoelectric point of proteins present in the serum, a consequent tendency to coagulation. She also showed that the same phenomena take place in shock occurring on the reinjection of a protein.

She concluded that anaphylaxis consists in: (i.) Modification of the physico-chemical constants of the blood associated with oscillation in the hydrogen ion concentration of the blood serum; (ii.) modifications in cell permeability which, permitting a change in the physico-chemical equilibrium of the cellular contents, lead to disturbance of structure of the protoplasm and in the physiology of the tissues; (iii.) physiological manifestations of these in the abnormal working of the organs.

These symptoms then are due to the sudden liberation of hydrogen ions in such excess that the buffers in the blood are inadequate to confine the reaction within physiological limits. If the protein is added slowly, regulation is easy and the symptoms do not occur. If a readjustment of the colloidal equilibrium fails to take place, the colloids in the blood and cells approach the point of coagulation and death results.

Natural immunity may be regarded as chiefly dependent on the efficiency of the phagocytic response.

Acquired immunity depends on the nature of the infecting organism. If it is not a toxic organism,

the adaptation is chiefly phagocytic and the immunity is not lasting.

If the organism is toxic, antitoxin develops and the immunity lasts for a shorter or longer period.

Following on the work of d'Herelle on the action of the bacteriophage, we have been presented with a new aspect of immunological possibilities. This phenomenon, first observed by Twort, of the solution of bacteria by some lytic principle, which is transmissible and whose activity can be enhanced at will, has been investigated by d'Herelle. He considers that the solution of the bacteria is due to an ultramicroscopic filtrable virus or corpuscle which preys upon bacteria. It is found normally in the intestinal tract in various conditions of virulence. He considers that it plays a preponderant rôle in immunity, that it is because of its presence that an individual exposed to infection escapes and that it is the cause of recovery of the individual when sick. In addition he claims that it secretes lysins which have a powerful opsonic action and thus stimulate phagocytic activity and that by its solvent activities it allows the antitoxic reaction of the cells full play and establishes an antitoxic immunity. If his claims are substantiated and they appear to be based on sound experimental evidence and clinical and epidemiological observation, he has placed in our hands an exceedingly powerful weapon.

The brilliant results in treatment which have accrued from immunological studies on those organisms producing exotoxins, raised hopes that similar success would attend in every case of disease due to bacteria. The results in the case of those bacteria which do not produce exotoxins, has not justified those high hopes. The antibodies produced are chiefly antibacterial. A certain amount of clinical success has followed the use of specific antisera in the case of pneumococcal, meningococcal, streptococcal, typhoid and plague sera. Here the importance of typing the particular organism must not be lost sight of. With efficient laboratories a survey of the prevalent strains, the preparation of specific sera and accurate diagnosis of infecting types, clinical evidence of some value may be obtained and considerable reduction in case mortality result.

Vaccination received its stimulus from Jenner and later Pasteur developed this method of active immunization. The best results are probably still to be obtained by the method of attenuation, but in the case of human beings the risk is in most instances too great and resort is usually made to heated or otherwise killed organisms, preferably those grown from the patient to be treated. Success cannot be expected in rapid generalized infections and in slow chronic cases with localization and protection by clot, pus or tissue changes such treatment to be successful must be aided by means directed to increase access of serum constituents to the lesion. The most successful cases are those in which the balance between defence and offence is

even, such as recurrent crops of boils. In some cases of inaccessible localized infection even with bacteræmia benefit may be hoped for on the ground that antigen is most energetically produced in the neighbourhood of the lesion and vaccination may assist by enhancing the formation of antibodies.

Ultimately clinical experience alone can justify the use of vaccines in any particular condition. Prophylactic vaccination has had some justification from its results. Much of importance on this subject cannot even be touched on in this address.

Non-specific immunity, by the injection of foreign proteins and the production of protein shock, is a subject which is still very obscure. The effect appears to be due to some temporary mobilization of the defensive agents in the body, a leucocytosis, an increase of proteolytic ferments in the blood stream and some increase in the output of antibodies. Similarly the stimulation of the production of latent antibodies to one bacterium by the injection of an unrelated organism or even non-bacterial protein is an example of a like reaction. For therapeutic purposes proper dosage is of the greatest importance. According to Petersen protein split products are most suitable for intravenous injection. For relatively mild reactions he recommends serum and for moderate general reactions intramuscular injection of boiled milk. There are also important contraindications such as intense physical depression, alcoholism, severe cardiac disease and diabetes.

I have put before you chiefly the colloidal point of view with regard to the mechanism of immunity, because to my mind it offers the best view of the facts. Colloidal chemistry is comparatively in its infancy and it is to the results of investigations in this field I believe we must look for the next significant advances in our understanding of the vital processes which are the special study of our profession.

#### FRACTURES OF THE FOREARM: THEIR NON-OPERATIVE TREATMENT.<sup>1</sup>

By LENNOX G. TEECE, M.D., Ch.M. (Sydney),  
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As I conceive it, the duty of the opener of a discussion such as this is not to enter into an elaborate classification of the different types of fractures to be met with in this region. These are known to everyone and are of ready access in every text book on the subject. Rather it behoves me to indicate what I consider to be the salient difficulties encountered in the treatment of these fractures and so to speak to provide certain pegs upon which the discussion may hang,

In dealing with fractures such as these whose management is notoriously difficult and whose results are so uncertain, we must bear in mind particularly the fundamental principles of splinting and be chary of departing from their rigid application. It may help to recapitulate briefly a few of the essentials of the art of splinting. Firstly to splint a fractured bone completely, we must immobilize the joint above and below it. This will involve the fixation of both the elbow and wrist joints, particularly of the elbow. For practical purposes the movements of pronation and supination can be regarded purely as a movement of the radius upon the ulna. Considering the freedom with which radio-ulnar movement can take place in the absence of fixation of the elbow, can any fracture of the radius be said to be adequately splinted when the elbow is left free to move? In such case at best it is left to chance as to whether rotatory deformity occurs between the two fragments of the radius; they can in no sense be said to be fixed. Opinions differ as to whether these fractures should be treated with the forearm in pronation, supination or in the mid-position, but let us realize that in whichever of these positions we put the fracture up, we can only preserve that position by fixation of the elbow.

A second principle of splinting that I would hesitate to mention, so elementary is it, were it not that its disregard is so common, is that the splints must fit the part; one too frequently sees wooden splints padded in such a manner as to present a convex surface. When we apply such convex splints to the anterior and posterior surfaces of the forearm which are themselves convex, grossly inaccurate fixation is the result. If bandaged tightly, they produce pressure sores; if loosely, their fixation powers are almost negligible. Therefore, if we do employ wooden splints, we must avoid those with padding neatly stitched in place beneath a covering and pad them ourselves at the moment of application.

A third principle of splinting and the most important of all in the fractures under discussion is that the existence of overlapping nearly always demands the application and the continuous maintenance of traction. Time will obviously not permit me to discuss or even to mention all the types of fractures of the radius and ulna, the displacements met with and the difficulties to be overcome. I propose therefore to confine my remarks to fractures of the shafts of both bones. These may possibly be regarded as the most difficult to reduce; they can undoubtedly be the most difficult in which to preserve reduction.

Considering the chief displacements encountered, one of common occurrence is an angular deformity without overlapping, in which both bones angulate at the site of fracture in the same direction, for example anterior angulation of both bones at the site of fracture or lateral angulation of both bones. These are the simplest of all to reduce and to maintain in position. Be the fracture high up or low down we can always secure sufficient grasp of the

<sup>1</sup> Read at a meeting of the New South Wales Branch of the British Medical Association on May 28, 1925.

fragments to undo the angulation and it then merely becomes a matter of the accurate application of well fitting splints. Preferable to wooden splints, I strongly insist, are metal splints of tin or aluminium, slightly curved from side to side or else moulded plaster of Paris splints. These can be made to fit the limb accurately and are infinitely more comfortable for the patient. All are agreed that it is of more importance to secure accurate alignment of the radius than of the ulna. With regard to this bone there are two schools of thought on the question as to whether the forearm should be placed in pronation or in supination. One school would have the relationship of the insertion of the *pronator radii teres* to the site of fracture govern the decision on this point. They tell us that if the fracture is above this level, the upper fragment is supinated by the biceps and that the limb must accordingly be placed in supination to obviate rotatory deformity. If the fracture be below this level, we are instructed to place the limb in the position of semi-pronation on the ground that the upper fragment is now pronated by the *pronator teres*. One thing they do not tell us is what we should do when the line of fracture passes through the insertion of the *pronator teres*; these form a very considerable group for the insertion of this muscle is over a considerable area of the length of the radius. The other school led by Robert Jones would disregard the site of fracture and treat all these cases in full supination, claiming that in this position the radius and ulna are farthest removed from one another and that therefore the danger of cross union is reduced to a minimum; they also deny that the theory as to the upper fragment being supinated by the biceps or pronated by the *pronator teres* is confirmed in actual practice. Both schools must remember that they cannot control radio-ulnar movement unless their splinting includes the elbow. Whilst agreeing with those whose views are voiced by Jones, I believe that the true defect of the semi-pronated position is that the force of gravity allows a downward sag of the forearm resulting in union with medial angulation. In the semi-pronated position if anterior and posterior splints be used, the only support the medial border of the limb has against the force of gravity is the support of the bandage encircling the splints and this is yielding and inefficient. This brings to mind another principle of efficient splinting, namely that a limb should be splinted in both places in relation to space. If we follow this principle accurately when we use anterior and posterior splints in the semi-pronated position, we should apply yet a third splint along the medial side of the forearm. Dr. Lawson, of Rooty Hill, in a personal communication, writes me that he has adopted this practice with success in preventing the occurrence of medial angulation which formerly used to distress him. Of course the use of such a medial splint combined with anterior and posterior splints demands that the splints be fitted with extreme accuracy.

A second type of fracture is one in which the ends of the four fragments approach one another,

so that the bony framework of the limb comes to be shaped like the letter X; or short of this either both the lower fragments or both the upper ones approach one another. These are impossible of manipulative reduction and the sooner it is recognized, the better. Digital pressure or interosseous pads are both futile in the effort to separate the fragments. Nothing but open operation and deliberate seizure of the fragments will suffice to effect reduction in these cases.

Let me put it this way. By a fracture of both bones the bony framework of the limb is divided into a proximal and a distal segment; when one segment moves as a whole upon the other as in simple angulation, manipulative reduction should be readily performed; when, however, within one or both segments the fragment of radius and fragment of ulna approach one another, we have no option but to operate and separate them. Do not for one moment cherish the delusion that by pressing deeply on the skin surface between the bones you can force them apart.

A third type of displacement, one that tries the ingenuity of the surgeon to the utmost, is that of overlapping of the fragments producing shortening. In order to restore the full length of the limb traction has to be applied with considerable force and furthermore in the vast majority of cases directly the traction is removed, the deformity will recur. The one exception I have found to this rule is fractures situated about four centimetres (one and a half inches) above the distal extremity of the bones; in these it is usually possible to make the fragments interlock when the limb has been pulled down to its full length. This I ascribe to the comparatively wide diameter of the radius at this point. With this exception, in order to prevent redisplacement we must employ continuous traction and it is a difficult problem to make this efficient. The application of traction demands the exercise of countertraction and it is the countertraction or the fixed point to pull against that it is difficult to secure. I assert that it is not possible to overcome any displacement except simple angulation by splinting without continuous traction.

With regard to the method employed to secure countertraction there are two regions against which we can exert our pull. Firstly by treating the limb with the elbow in full extension we can exert our pull against the chest wall. This is the principle on which the straight Thomas's arm splint works. Its use demands that the patient be kept at rest in bed with the arm at right angles to the body and even then it is most inefficient; only a small portion of the circumference of the ring exerts pressure against the chest wall; the force varies with every movement of the patient. To attempt to employ the form with a swivelled ring as an ambulatory splint is futile for then the counterpressure is against the axilla which cannot tolerate any considerable pressure.

The other region against which counterpressure can be obtained, is the upper arm when the forearm is bent to a right angle and in order that the force



may be a steady, constant one, it is imperative that the elbow be fixed at a right angle and not merely supported in a sling in that position. There are several devices by which this may be done. Firstly there is the "three plaster" method; two separate encasements of plaster are applied, one around the upper arm, the elbow and the upper part of the forearm, the other around the hand, wrist and lower part of the forearm. These are allowed to set and then whilst traction is applied, the gap between the two segments is filled in with a third plaster bandage. This device I have found quite impotent to prevent a recurrence of the overlapping because it is impossible to apply the plaster with sufficient accuracy around the region of the wrist to prevent the lower segment of the limb slipping up within the plaster and thus producing a return of the overlapping, for there are no salient bony prominences in this region against which pressure can be exercised.

The Jones's humerus splint is moderately efficient in providing traction and countertraction when used for fractures of the forearm. To secure adequate countertraction the upper arm must be very firmly bandaged between the bars of the splint and therein lies its weakness. It will be found in practice that it is impossible to fix the upper arm in total immobilization in the splint; some play will be sure to remain and this will be sufficient to allow the fragments to overlap. The upper arm is at any time a difficult segment to fix on account of its shape, consisting as it does of a single bone rounded in section surrounded by a singularly mobile sleeve of soft parts. I have been forced to the conclusion that nothing short of an accurately moulded encasement of plaster of Paris will serve the purpose. With this end in view I have devised this splint which is best described as a modification of the Jones's humerus splint. The modification consists in its greater rigidity and the addition of a piece of sheet metal passing from one side bar to the other across the front of the upper arm. The metal is punched with numerous holes, since the purpose of the splint is that the upper arm and elbow may be fastened in it by plaster of Paris bandages. Traction is secured by precisely the same means as with the Jones's splint.

Dr. Watkins, of Newcastle, has invented a very ingenious splint, of which he has been good enough to furnish me with a sample. It is best described as an expanding splint. By means of springs the two ends of the splint are constantly trying to recede from one another, so that when by adhesive strapping or other means the two ends of the forearm are fixed to the corresponding ends of the splints, a continuously acting traction force is put into operation. I have not yet had an opportunity of testing the practical application of this splint. From theoretical study the most likely point in which trouble may be experienced, is in the case of a high fracture the difficulty of attaching a short upper segment of the forearm to the proximal or posterior end of the splint. This could be minimized by incorporating in the splint a device for fixation

of the elbow. I have emphasized the correction of overlapping as the chief problem in these fractures and I can see no great theoretical objection why direct skeletal traction should not be employed by means of such screws as I show here applied to the lower ends of the bones. If applied sufficiently near the distal ends of the bones, there would be no fear of them pressing the fragments together across the interosseous space. The chief thing to be feared would be interference with the action of the extensor tendons of the thumb. I have not yet tried skeletal traction, but I believe it has been attempted in America and I think the point should be investigated, though we must remember that it does not attack the main aspect of the problem which is the attainment of adequate points of countertraction.

In the present state of our knowledge many of these fractures come to operative reduction. Speaking broadly I consider it to be a healthy attitude of mind to regard operative reduction as a confession of weakness and the more versatile and resourceful our splinting, the more infrequently shall we have recourse to operation; we should not feel satisfied that that same open operation has been necessary unless in its performance considerable difficulty is experienced in replacing the fragments in position.

One word as to the results. It must be admitted that numerous grossly bad anatomical results present good function. As regards strength of the limb I have seen a man doing pick and shovel work on the roads with an angular deformity of 45°. However, it must be remembered that a bad anatomical result usually spells considerable interference, sometimes amounting to abolition of the movements of pronation and supination and though for some of this compensation can be effected by rotation at the shoulder joint, for the proper exercise of many trades a full range of pronation and supination is essential. We have all seen unskilled labourers carrying out their work without difficulty in spite of gross malunion of a fractured forearm. Let not this lull us into a false attitude of carelessness and make us content with bad anatomical results, for the skilled tradesman demands the ability to carry out the finer functions of the limb.

I feel sure that objection will be raised that the general practitioner in whose hands the care of the majority of these patients lies, cannot be expected to have always at hand a variety of special splints for use in such cases and that he must perforce rely on plain straight wooden splints. I fail to see why he should not do so; the expenditure of a few pounds will provide him with an ample and everlasting stock. At the very least he should always be provided with plaster of Paris so that he can fix the elbow and so control radio-ulnar movement. In any event let us be candid with ourselves and admit that if we confine our armamentarium to straight wooden splints, we are except in cases of simple angulation doing nothing to reduce the fracture or to maintain it reduced and are in fact leaving the result to pure chance.

# THE TREATMENT OF COMPOUND FRACTURES OF THE FOREARM.<sup>1</sup>

By ARCHIE ASPINALL, M.B., Ch.M. (Sydney),  
*Honorary Surgeon, Sydney Hospital.*

WHEN it was suggested that I should read a short paper on fractures of the forearm from the point of view of the general surgeon I thought that a discussion on the treatment of compound fractures of the forearm might be of value. Having seen during the last nineteen years at the Sydney Hospital a large number of such fractures treated by other surgeons and having treated a goodly number myself, I thought my task would not be a difficult one.

However, I must confess that I have found it no easy matter to know where to start and where to end. I have decided to deal with the general principles of treatment adopted by myself, rather than to attempt to deal with individual fractures in detail, hoping thereby to permit of a general discussion and to have the advantage of hearing the views and learning the methods of members of both sections here tonight. You will, I trust, forgive me if much that I say appears elementary to you.

I have not been able to ascertain the number of compound fractures of the forearm treated at the Sydney Hospital, but the following figures give the numbers of fractures of the forearm treated during the last three years without classification: Ulna 179, radius 742, both bones 198.

In a city hospital such as the Sydney Hospital, the members of the surgical staff are called upon to deal with compound fractures of every degree of severity. These range from the case in which there is but a clean break of the bone or bones with a slight puncture of the overlying skin, to the grossly lacerated arm in which the question of amputation has to be considered.

It is a strict rule of the hospital that the surgeon must be informed immediately of the admission of a patient suffering from a compound fracture under his care.

Most patients have received first-aid treatment prior to admission either by a medical practitioner or someone possessed of a knowledge of first aid.

I propose to deal with two classes and to indicate to you the technique employed by me in their treatment in hospital: (i.) The simple, uncomplicated compound fractures; (ii.) the grossly lacerated arm with complicated compound fractures.

In class (i.) after careful examination for injury to nerves, vessels and tendons to see that the case comes under this heading, an anæsthetic is administered. It is well to draw your attention to the need for careful examination of the patient as a whole, as well as the injured limb, at the outset prior to the administration of an anæsthetic, as the patient may be suffering from some internal

injury, such as ruptured liver in addition to the obvious injury. At this juncture all that is necessary, in my opinion, is to prevent contamination of the wound, next to place the arm on a suitable splint, providing free access to the wound and extension if necessary, after having manipulated the bone or bones into as good position as possible. The hook, as shown, employed by Dr. Corlette may be useful in reducing the fracture.

I do not hesitate to excise the skin edges, also to enlarge the wound when dealing with the patient in the operating theatre if deemed advisable, for example, if there is considerable extravasation of blood causing pressure on the skin.

Frequently an X-ray examination is not possible at once, but the wound rather than the fracture is of primary importance. The need for extreme gentleness to prevent further injury is, of course, always borne in mind.

One cannot be dogmatic about the best type of splint to be used, as that can only be determined by the surgeon after consideration of all the factors of the case.

I have found a modified Thomas's splint or a Robert Jones's humeral traction splint the most useful.

The fractures in class (ii.) are frequently the result of machinery or street accidents. A tourniquet has in many cases been applied prior to the patient's arrival at hospital and the patient is suffering severely from shock. It is important that the tourniquet should be loosened and removed, if possible, and also that the patient should be taken to the operating theatre without undue delay.

Shock is greatly increased by the presence of the tourniquet, also by attempts to cleanse the wound without anæsthesia. The administration of gas-oxygen anæsthetic enables one to deal with the case earlier than with the use of other forms of anæsthesia.

The possible presence of organisms causing gas gangrene must be always borne in mind. We have had several cases of gas gangrene following compound fractures during recent years, mainly the result of tram accidents where street dirt has been ground into the tissues.

On seeing the patient in the ward a rapid survey of his condition is taken and the injured limb is examined for signs of injury to nerves, vessels and tendons, if this can be done without distressing the patient.

If the patient is in a fit condition and over the age of twenty-one years, he is asked to give the surgeon full permission to deal with the injured limb as he thinks best after more thorough examination under anæsthesia. If relatives are present, it is wise to inform them of the nature of the injury and the probable result thereof.

Beyond placing an antiseptic dressing on the wound, nothing is done in the ward.

My practice is to attend to the cleansing of the wound and surrounding parts myself, as I find it

<sup>1</sup> Read at a meeting of the New South Wales Branch of the British Medical Association on May 28, 1925.

more satisfactory to do this than to attempt to instruct anyone else, because in a training hospital the staff, both nursing and medical, is constantly changing.

The plan I adopt is as follows:

*Step One.*

I prepare myself as for any other surgical operation and have three pairs of rubber gloves sterilized for my use. The first pair of gloves is put on and over them a second pair of larger size to permit of easy removal.

*Step Two.*

The arm is placed over a sterile tray.

The skin cleansed with ether, care being taken to work away from the wound and then painted over with tincture of iodine. The use of soap solutions and copious antiseptic lotions is avoided as in my opinion their use is likely to result in further contamination of the wound.

With machinery accidents my experience is that the grease and oil on the skin does not interfere with the healing of the wound and little attempt is made to remove them.

*Step Three.*

The lacerated edge of the skin surrounding the wound is cut away, forceps and scalpel being used.

*Step Four.*

The outer pair of gloves is now removed and any obvious contamination removed from the wound by swabs moistened with 2.5% carbolic lotion and the ends of the bones cleansed in the same manner, if projecting from the wound.

*Step Five.*

The tray is next removed and my assistant surrounds the arm with sterile towels and places it on a board which projects at right angles from the side of the operating table, whilst my gloves are removed and replaced by the third pair.

The procedures described are rapidly carried out and now everything is ready for a more detailed examination of the wound.

The following points are carefully noted:

1. The loss of or damage to the skin. In machinery or tram accidents the skin is almost always stretched and its vitality destroyed to a greater extent than is apparent. The loss of skin may be the determining factor in deciding whether the limb should be amputated or not.

2. The condition of the blood vessels and the circulation in the fingers. If circulation is good, every effort is made to save the arm.

3. Injury to nerves. Primary suture is attempted with plain catgut, if this can be done without unduly prolonging the operation or opening up fresh tissues.

4. Injury to muscles and tendons. Grossly damaged muscle is removed and tendons sutured with plain catgut, if possible.

5. The injury to the bone or bones.

You will notice that I have placed the fracture last. I do so because I regard the wound as the

more important. At this stage an attempt is made to put the bones into position and loose fragments are not removed if of any use. I do not hesitate to place a piece of silver wire around the bones to hold them in position if this can be done easily. I do not use any method involving drilling of the bones.

If the wound has not been contaminated in the first instance to any considerable extent, the wound is drawn together loosely with fishing gut sutures, so that free drainage is provided. Incisions are made in the skin to relieve tension. I do not use drainage tubes, preferring to leave the wound sufficiently open to drain freely without their use. An antiseptic dressing consisting of sterile gauze soaked in 1 in 60 carbolic acid solution and squeezed as dry as possible is placed on the wound. This dressing is left on, even though soaked with blood, provided the temperature remains normal and the patient's condition is quite satisfactory. There is always danger in frequent changing of dressings of subsequent infection of the wound.

The arm is placed on a splint so designed that inspection and dressing of the wound may be easy.

If some extension can be obtained, so much the better, but frequently this is not easy to arrange immediately and can be better done at a later stage.

Antitetanic serum is given as a routine in street or similar accident cases.

If the wound has been grossly contaminated Carrel-Dakin tubes are placed in the wound, which is not closed at all and the Carrel-Dakin treatment instituted immediately the patient returns to the ward.

The most difficult problem in some cases is to decide whether an attempt should be made to save the limb or whether it should be amputated without delay.

Not infrequently the injury is so severe and the contamination so great that there is no difficulty in deciding upon immediate amputation.

It is the border line case that causes one furiously to think and this class must depend on the experience of the surgeon and the facilities for treatment available. However, one can well afford to be conservative in the majority of cases, bearing in mind the maxim that "any arm is better than no arm." I am inclined to risk more to save an arm than a leg.

Most of us have had a patient whose arm we have saved and the patient has been able to resume his occupation, although the appearance of the arm shocks the layman and the X-ray picture is too dreadful to contemplate. I think it important to get the patient out into the fresh air at first opportunity as exposure of the wound to direct sunlight is beneficial and the mental outlook of the patient is greatly improved as soon as he is allowed out of bed.

In conclusion my experience has been that the majority of compound fractures in civil practice do well as they are so often free from infection.



## Reports of Cases.

### URETHRAL HERNIA OF THE BLADDER.<sup>1</sup>

By ST. J. W. DANSEY, M.B., Ch.M. (Sydney),  
Honorary Surgeon, Royal Prince Alfred Hospital,  
Camperdown, Sydney; Lecturer in Clinical  
Surgery, University of Sydney.

#### Clinical History.

A PATIENT, aged fifteen years, single, complained of pain of a dull, aching character in the left lumbar region of one year's duration. The pain started suddenly and was acute for one day. At times the pain in the side became severe for some hours and on these occasions vomiting occurred. Urinary frequency was associated with pain and occasionally the urinary flow stopped abruptly. The patient noticed for some time that on straining after the passage of urine a lump appeared in the front passage; it remained for a varying time and then disappeared. When the patient was admitted to hospital, the swelling became noticeable after a forcible cough.

On examination the patient appeared to be a well nourished, but anæmic girl. Tenderness was present over the left kidney and ureter. Occasionally after the patient strained or coughed a red piriform swelling, about the size of a hen's egg, was noticed protruding from the urethral orifice. This tumour was covered with congested mucous membrane and bled easily on palpation. The mass was cystic in character and Dr. Furber who first saw the patient in the outdoor department, reported that he could definitely make out a small, hard body in the mass. The protrusion was readily reduced by pressure and this left a greatly dilated, but normal urethra. The urine was acid and contained pus and many microorganisms. X-ray examination revealed a definite shadow, about 1.5 centimetres (five-eighths of an inch) in diameter in the region of the bladder. A subsequent skiagram revealed this shadow along the left ureteral line and not in the bladder.

Under ether anæsthesia the urethra readily permitted free digital exploration of the bladder and a soft mass was discovered lying in the base of the bladder. Cystoscopic examination did not reveal any further details of the mass. The bladder was opened suprapubically and the soft mass proved to be a protrusion of the bladder wall in the vicinity of the left ureteral opening. This protrusion measured about 6.25 centimetres (two and a half inches) in length with a diameter of about three centimetres (one and a quarter inches). After incision of the mass the finger entered the greatly dilated left ureter and a stone was felt high up in the ureter. The calculus was removed and the walls of the sac were cut away, leaving about 0.6 centimetre (a quarter of an inch) at the base. This was oversewn with catgut uniting the bladder mucosa with that of the ureter. About a week later a cystoscopic examination revealed the left ureteral opening well contracted with a surrounding ring of healing granulation tissue. A ureteral catheter was passed into the pelvis of the kidney and left *in situ*. During the following fourteen hours, about two hundred and forty cubic centimetres (twelve ounces) of urine were passed through the catheter. A pyelogram was obtained after the injection of potassium iodide solution through the ureteral catheter and the pelvis of the kidney proved to be normal.

#### Comment.

The condition must be very rare. I can find no reference to a similar occurrence. I take it that the course of events leading to the condition was first the passage of the stone from the kidney a year previously or the gradual formation of the stone *in situ* in the ureter. This calculus passed down to the ureteral opening in the bladder and there caused an intermittent blocking. The blocking in its turn produced a gradually increasing protrusion of the

ureteral orifice with the bladder wall and large dilatation of the ureter. The protrusion ultimately reached such a size that when the patient strained it was able to pass a toneless *sphincter vesicæ* and become at times a hernial protrusion. That the ureteral calculus acted intermittently as a ball valve is shown by the fact that there was no demonstrable hydronephrosis and that the kidney was secreting urine in a normal manner. Although the ureteral orifice must be frequently blocked in a similar way by a calculus no such protrusion of the bladder wall occurs.

### DOUBLE ABDOMINAL CATASTROPHE.

By NORMAN E. DAVIS, M.B., Ch.M. (Sydney),  
Kingaroy, Queensland.

ON February 17, 1925, J.S., a male, aged thirty years, was admitted to hospital complaining of severe pain in the region of the umbilicus of four hours' duration accompanied by vomiting. The pain on admission had extended downwards and to the right and a point of maximum tenderness was elicited about McBurney's point. The general condition was good, his temperature was 37.3° C. (99.2° F.). As a point of importance in later events no history of previous indigestion could be obtained nor was any definite rigidity present. On operation it was found that the whole caecum which could not be delivered at the wound, was dark purple and completely strangulated by a tight band. This band proved to be the appendix with its tip adherent near the base. The caecum had evidently slipped through the appendiceal loop, for when a mass of the contents was slowly pressed out of the caecum through the constriction, the caecum was easily reduced. It appeared viable and was left, but the appendix was removed. There was no free fluid of any description present.

The patient on recovery from the anæsthetic was moderately comfortable for about ten hours and then without warning he was attacked suddenly by excruciating pain in the epigastrium with vomiting. The abdominal muscles were board-like and the facies anxious.

Immediate operation was decided upon and the abdomen reopened by a right pararectal incision above the umbilicus. When the peritoneum was opened a rush of yellow fluid mixed with food escaped and as a result of further search a small hole was found in the anterior wall of the pyloric end of the stomach. Owing to the condition of the patient only a double purse string invagination of the perforation was undertaken and the wound closed without drainage. His condition was critical for several days and then he began to improve rapidly. Convalescence was interrupted by an abscess in the pelvis which was opened through the rectum, and by a sinus forming in the abdominal wall, but these ultimately healed and he was discharged in good health on June 18, 1925.

The case is of interest for the following reasons: (i.) The rather unusual primary condition; (ii.) the almost simultaneous occurrence of two distinct, serious conditions requiring surgical interference, neither of which were common; (iii.) my complete failure to obtain any previous history even suggesting the presence of a gastric ulcer.

### RIB IMPLANT FOR DEPRESSED BRIDGE OF NOSE.

By CLIVE M. EADIE, M.B., B.S., (Melbourne),  
Clinical Assistant, Department of Disease for Ear,  
Nose and Throat, Melbourne Hospital,  
Melbourne.

A WOMAN, aged thirty years, first consulted me in January, 1919, for a condition of vasomotor rhinitis. She gave a history of having broken her nose whilst diving six years previously and of having undergone a septal

<sup>1</sup> Read at a meeting of the New South Wales Branch of the British Medical Association on May 14, 1925.



FIGURE I.  
Patient before Operation. Front View.

resection on account of the obstructed airway. Following this operation a sinking in of the bridge of the nose took place. In January, 1925, she decided to have the deformity corrected. Her appearance at that time is shown in Figures I. and II.

On February 28, 1925, the operation was performed under ether anaesthesia induced by the intratracheal method. The skin of the face was swabbed with spirit and in addition that of the columella and nasal vestibules was painted with tincture of iodine. Pieces of gauze were inserted into each side of the nose. A vertical incision eight millimetres long was made in the midline of the columella shown in Figure III. The incision extended through the skin and subcutaneous tissue to a depth of six millimetres. Bleeding which was of a general capillary type, was rather free. In making this incision the small septal artery may be avoided by not cutting too far towards the lip. The long thin elevator, such as is used in West's intranasal dacryocystotomy, was employed to separate the deep tissues towards the tip of the nose and care was taken not to make a perforation either into the

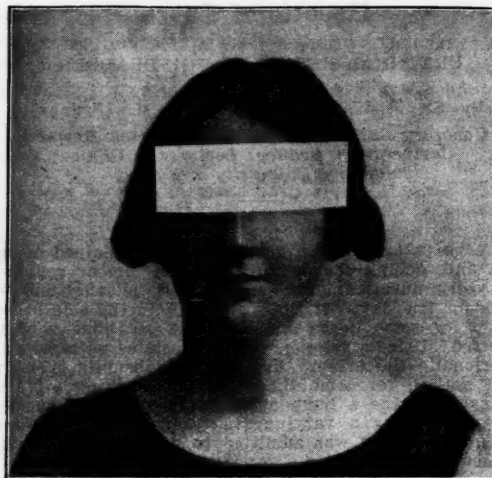


FIGURE IV.  
Patient after Operation. Front View.

vestibule or nasal passages. The tissues in this region are rather dense and it is necessary to make occasional use of the knife. The elevator was then directed up towards the root of the nose and pushed on until it lay in the subcutaneous tissue planes over the bridge. The skin was elevated over and around the depressed area, a pocket being formed for the implant. The skin over the seventh costal cartilage having been prepared, an incision was made down to the rib. The perichondrium was divided and separated from the cartilage. The piece of cartilage was removed with a hammer and gouge and was put with a pair of dressing forceps through the incision in the columella into position so that it filled up the nasal depression. In this instance three pieces of rib cartilage were inserted. The columella incision was closed with one horse hair suture and a gauze and collodion dressing was applied. A piece of cotton wool was put into each vestibule. No external splint was used, the patient being watched carefully while regaining consciousness. The wound over the rib was closed with one deep and several cutaneous sutures. A collodion dressing was applied and



FIGURE II.  
Patient before Operation. Lateral View.



FIGURE V.  
Patient after Operation. Lateral View.

was allowed to remain until seven days later when the sutures were removed. The collodion dressing on the columella and the suture were removed after four days. Healing took place by first intention. The recovery was uneventful and the scar on the columella could be found only by careful examination.

In this method of transplantation the field of operation can be made and kept sterile and the scar is practically unnoticeable. The present state of the patient is shown in Figures IV. and V.



FIGURE III.  
Diagram showing  
Site of Incision.

## Reviews.

### TWO ESSAYS ON TUBERCULOSIS.

KRAUSE'S "Environment and Resistance in Tuberculosis" is a most timely and useful production.<sup>1</sup> It is only a small work of one hundred and forty pages, comprising two essays, one dealing with the subject of environment, the other with that of resistance in relation to the problem of tuberculosis. These have been elaborated by the author from two addresses given by him on these subjects.

The detronement a generation ago of the importance of the hereditary factor in tuberculosis which naturally followed on the proof of its infectivity and the general acceptance during the past generation of the fact that infection with tuberculosis is an almost universal occurrence in early life, at any rate amongst city dwellers, have both led to an ever increasing emphasis on the importance of environment in determining whether an infected individual shall become a sufferer from tuberculous disease. Hence the importance at the present juncture of clear thinking on the subject of environment; hence also the value of the first essay in this book, consisting as it does of a very thoughtful and far reaching inquiry into what really constitutes environment. As the writer points out, many men speak as though one's environment consisted merely in inanimate objects—a truth that can be easily recognized by remembrance of the frequency with which we see and hear the expression "tuberculosis is a question of housing." But this bald statement quite overlooks the fact that in this as in other infections the most important factors in our environment are the other human beings who surround us. What scientific evidence have we as to how large a part the actual housing plays in the disease as compared with the poverty which drives such people to such quarters, with consequent malnutrition, "deprivation of recreative enjoyments, unusual opportunities for contact with many acute infections, lack of proper after care in pregnancy and disease and so on"? The author emphasizes the part that trauma plays in the development of an otherwise latent infection, has an open mind on the possibility of much more frequent development from reinfection in adult life than is admitted in many circles at present and while he lays so much emphasis on environment, quite frankly discusses the part that accidental factors play in the subsequent development of disease according as the original focus may be apical or in the neighbourhood of a large vein or lymphatic vessel into which ulceration may easily occur.

Similarly in the longer essay on resistance the author confronts us with these glib formulæ for "increasing resistance" with which we are all familiar and confesses his wonder as to what is going through the mind of the man using such terms. Does he mean anything? Or does he "merely wish to avoid mental exertion and therefore seek to explain an effect by a handy word"? These are pertinent questions for us all in regard to other infections as well as tuberculosis. In discussing this ques-

tion the author amplifies his previous remarks on the influence of situation—the difference between a latent infection and an acute process often consists merely in the mechanical barrier interposed by the fibrous wall of a "tubercle" between the enclosed bacilli and the adjacent lymph vessel. In such cases respiratory infections act not by lowering a general resistance, but by softening fibrous tissue. "The patient is as resistant as the shell of his tubercle."

Tuberculosis is so largely a lymphatic infection that discussion of this aspect of resistance quite naturally follows. Without tracing the argument through all its stages, this essay like the first can be commended for its clear thinking, its suggestiveness and its philosophic outlook. The two combined form a delightful little chapter in the literature of the subject and no better book could be put in the hands of a student to form a basis for his thought on the subject or in the hands of anyone desirous of clarifying his thinking.

### INFECTIOUS DISEASE.

THE latest British publication on the acute infectious diseases is from the pen of Dr. J. D. Rolleston.<sup>1</sup> The subtitle, "A Handbook for Practitioners and Students," is not a very happy one. The junior student will find it dry and hard to read and the practitioner will complain that the sections on diagnosis and treatment which to him are the most important, give him little help.

Nevertheless, the book fills a gap in that it deals exhaustively (and exhaustingly) with the anatomical and physiological changes and symptomatology in the commoner diseases and their complications. Thus as a work of reference it will be found valuable by those who come much in contact with those diseases.

Dr. Rolleston has had a long experience of fever hospital work and as editor of *The British Journal of Children's Diseases* has a very wide acquaintance with the literature. Two unfortunate results of this wide reading may be noted. Intermingled with well authenticated facts, proved by the observations of the author and other reliable British clinicians, we find opinions and statements by more or less obscure investigators. In many cases these are not worth the paper on which they are written. We note also a lack of sense of proportion. For instance, exactly one page suffices for the diagnosis of laryngeal diphtheria and exactly the same space is occupied in a discussion of diphtheritic hemiplegia. How many medical men in the world have ever seen a case of the latter? Then we find a whole six pages devoted to serum sickness in diphtheria. No prominence is given to the difficulty in feeding babies suffering from whooping cough and the occurrence of hæmorrhage in typhoid fever is lightly treated. Such as these are the very points upon which the general practitioner desires advice.

A few statements are made which are not in accord with the experience of the vast majority of observers. Examples are: "The smallpox patient is infectious in the incubation period"; "in intubation cases nasal feeding is almost always required." Dr. Rolleston's opinions about smallpox in view of his extensive experience of the disease are worthy of respect and the statement demands investigation, but it is obvious that he has had little or no experience of intubation.

The differential diagnosis of chickenpox from smallpox has been inadvertently omitted. On page 321 the author promises to deal with it in the chapter on smallpox, but when we come to the expected discussion we are referred back to page 321.

All this must not be taken to mean that the book is not very well worth reading. To one tolerably familiar with the subject it will prove a treasure. Page after page could be cited in each of which a particular subject is dealt with better than in any other textbook. Its fault

<sup>1</sup> "Environment and Resistance in Tuberculosis," by Allen K. Krause; 1923. Baltimore: Williams and Wilkins Company; Crown 8vo., pp. 137. Price: \$1.60.

<sup>1</sup> "Acute Infectious Diseases: A Handbook for Practitioners and Students," by J. D. Rolleston, M.A., M.D. (Oxon.); 1925. London: William Heinemann (Medical Books), Limited. Demy 8vo., pp. 375. Price: 12s. 6d.



is that from the point of view of the man who is attempting to make a sick child well, it is a mass of scientific detail rather than a bedside help. Comparisons are dangerous and often inadvisable, but, while in justice to Dr. Rolleston it must be said that he has added considerably to our knowledge of the pathology of infectious diseases, his book can never rival the late Claude Ker's wonderful textbook. Every line that Ker wrote was addressed to the man at the bedside, his work is a model of what a textbook should be and now that he is gone it is difficult to name his successor. If J. D. Rolleston with his great knowledge will make his appeal a little wider, there is no reason why he should not be the man.

### THE MECHANISM OF SECRETION.

PROFESSOR SWALE VINCENT would not object to be called a disciple of Sir Edward Sharpey-Schafer whom he resembles in keeping experimental research associated with the best technique in histological examination. Professor Vincent has dedicated his life work to the study of the ductless glands and his authoritative writings on this topic are well known. In the present volume, "An Introduction to the Study of Secretion," he takes a wider outlook and gives a summary of present views on secretion as a whole, both general theory and the detail of each secreting mechanism.<sup>1</sup> This is admirably done and we can recommend the book without reservation. Naturally there are regions of research where the evidence is conflicting. Here Professor Vincent sums up judiciously and, though sometimes the conclusion is not as dogmatic as the student would like, the attitude is that of a man of science.

When the author comes to internal secretion he is in his own particular territory and it is to this part of the book that the medical practitioner will turn. Amid the tumult and shouting of clinical endocrinologists it is pleasant to hear the calm critical voice of the trained experimentalist. Professor Vincent's short summary supplies a much-needed corrective to the overspeculative matter which still fills up too large a space in current medical literature.

We challenge only one detail in the book. The statement is made about sebaceous secretion that "it serves also to prevent undue loss of heat from evaporation of the sweat." Now oiling the skin has been shown to interfere not in the slightest degree with the evaporation of sweat and moreover the mental attitude may well be questioned that expects the body to have a mechanism for the performance of some function and then possess a second mechanism to prevent the first from acting. We have met this in speculations about blood clotting and elsewhere.

### DIGITALIS.

"THE ACTION AND USES IN MEDICINE OF DIGITALIS AND ITS ALLIES," by an acknowledged master of the subject, gives a very full and complete account of our present knowledge of the action and uses of digitalis.<sup>2</sup>

Professor Cushny has made many valuable contributions to this knowledge and besides his own original observations, he has checked carefully the experimental results of others, so that he is able to speak with authority.

He was closely associated with Mackenzie in directing the clinical researches at Mount Vernon Hospital, where he investigated among other things the point at which digitalis acts in slowing the ventricle in patients in whom the auricles are fibrillating. This question is fully discussed in the work under review and the author is still

convinced that the effect is chiefly on the bundle tissues direct and little if at all through the vagus nerve. His survey, taken in conjunction with Lewis's recent discussion of the whole subject, will enable those interested to form their own conclusions, as the available evidence is clearly set out. Very strong evidence is brought forward that digitalis has a direct action on the heart muscle and that this action, at least in cases with normal rhythm, is more important than vagal inhibition. Among the points of special interest discussed are the various proprietary preparations of digitalis and its allies, which the author shows are mostly of uncertain composition and not, as is often claimed, accurate combinations of glucosides or pure substances. He points out that, not only are the active principles not yet accurately separated in the pure state, but there is still a doubt as to their real nature. He shows that these preparations have never been proved in any way superior to the much cheaper and more easily obtained tincture or powdered leaf. He concludes that the simple pharmacopoeial preparation is the best.

Professor Cushny shows that cumulation is an essential feature of the action of digitalis and that no drug which is not cumulative in its action, could possibly be as useful, for what is needed is a steady, moderate, but not over intense action. A dose small enough to avoid the cumulative action is too small to be effective. He also calls attention to the absurdity of the claims made for proprietary drugs of this group that they are not cumulative and shows that this, if true, could only mean that they contain too little of the active principles to be valuable.

Those who still feel an uncomfortable doubt as to the propriety of administering full doses of these drugs to patients with high blood pressure will find a full discussion of the subject, both from the experimental and the clinical points of view. It is shown that the smallest dose of digitalis which could have a direct action on the arterial muscle, would be large enough to poison the heart severely, and probably fatally. Moreover, in any dose which is possible in therapeutics, there is no vasoconstrictor action.

He also points out that raised temperature rather assists the action of digitalis and that there is no reason for the fear that the drug must be inactive in fever, a view which many will share on more indefinite clinical grounds.

This book can hardly be omitted from the shelves of any physician who is interested in cardiac problems and though a good deal of it is devoted to pharmacological discussion, the direct clinical value of the work is so great that it should be studied by all.

### ORTHOPÆDIC SURGERY.

"THE ADVANCE OF ORTHOPÆDIC SURGERY" by A. H. Tubby is a brief review of the progress made since the publication of the author's textbook on orthopædics in 1912, and includes therefore the period of the Great War.<sup>3</sup> To that extent it is a continuation of the author's previous work, but the subject matter does not follow textbook form and is confined to fresh points of view which have since arisen.

Of particular interest to those desiring full information is the elaborate bibliography, while the subject matter itself must appeal to those in general practice. His insistence on stereoscopic radiograms is noted as a general practice and another chapter is devoted to asymmetry as an important factor in scoliosis. Reference is made to eye strain following postural defect and the steady improvement in errors of refraction when the defect is remedied.

In the last chapter the author expresses his firm conviction that the true orthopædic surgeon is he who has not ceased to practice general surgery, although he takes special interest in orthopædic problems.

<sup>1</sup> "An Introduction to the Study of Secretion," by Swale Vincent, LL.D., D.Sc., M.D., F.R.S. (Edin.), F.R.S. (Cantab.), M.R.C.S., L.R.C.P., F.Z.S.; 1924. London: Edward Arnold and Company; Demy 8vo., pp. 168, with 35 illustrations. Price: 10s. 6d. net.

<sup>2</sup> "The Action and Uses in Medicine of Digitalis and its Allies," by Arthur R. Cushny, M.A., M.D., LL.D., F.R.S.; 1925. London: Longmans, Green & Company. Royal 8vo., pp. xi. + 303. Price: 18s. net.

<sup>3</sup> "The Advance of Orthopædic Surgery," by A. H. Tubby, C.B., C.M.G., M.S. (London), F.R.C.S. (England), F.S.A.; Reprinted from "The Clinical Journal"; 1924. London: H. K. Lewis & Company, Limited. Crown 8vo., pp. xii. + 144, with illustrations. Price: 7s. 6d. net.

## The Medical Journal of Australia

SATURDAY, AUGUST 1, 1925.

### Anaphylaxis.

THE readers of THE MEDICAL JOURNAL OF AUSTRALIA are offered an intellectual treat this week. It is but a short time since Professor Peter MacCallum was appointed to the chair of pathology at the University of Melbourne. His article is the first that we have had the privilege of publishing. A newcomer filling an important professorial position shoulders a heavy responsibility. His methods are watched both within the medical school and without; he is judged critically by students and teachers; his knowledge, his ability to teach and his versatility are subjected to close scrutiny. His responsibility is not limited to his class and lecture rooms. The whole medical profession has a right to benefit by his work and to turn to him for information. In these circumstances Professor MacCallum's first article will be criticized by every medical practitioner who takes his life's work seriously. We do not hesitate to state that his clear elucidation of a very difficult subject or rather series of subjects, his manner of presentation, his erudition and his perspicacity have established for him the enviable reputation of a competent teacher. We tender him our congratulations.

In the early years of the present century there was much controversy between the adherents of three schools of thought in the realm of immunology. The first may be called the biological school. There were many hypotheses founded on biological reactions between infecting bacteria and the tissues of the host. Next came the chemical school, led by Paul Ehrlich. The antigen-antibody reaction, that is the production by body cells of a specific substance—an amboceptor—in response to the introduction into the body of a foreign protein and the combination of these two substances with the normal ferment of serum, called complement, was explained by the assumption of an analogy to the attaching of side chains to a central nucleus of a

chemical compound. This view had very much evidence in its favour. In the third place there was the physico-chemical school, the chief exponent of which was Metchnikoff. According to this school the phenomena of phagocytosis are the most important of the processes in immunity. Ehrlich opposed the conception of mass action in connexion with the antigen-antibody-complement combination. He maintained that a definite selective chemical affinity existed which determined the nature of the reaction product. At first when Arrhenius and other physicists sought to demonstrate that the phenomena of surface tension and dispersion of colloidal particles in accordance with physical laws were concerned in these reactions, the views put forward were opposed because their advocates were less versed in the observed facts connected with immunology than in the ascertained behaviour of colloids. Later with closer study of the former in the light of the latter a reconciliation has taken place and many of the earlier disputes have been settled.

Professor MacCallum realizes the importance of the alteration of the physical condition of the colloids of the body in the phenomenon known as the anaphylactic shock. He wisely refers to the ingenious investigations of Mademoiselle Mendéléeff and the previous work of Bordet. It appears to us, however, that the sudden liberation of hydrogen ions in great excess as a result of the introduction of the second or intoxicating dose of protein does not represent the full story of anaphylaxis. No one has yet demonstrated that there is any modification in the colloids of the body fluids in response to the injection of the sensitizing dose of protein. The animal is apparently unharmed and unaffected and yet a gradually evolving change is going on within its body. After eight to twelve days it has become hypersensitive to the particular protein with which it was sensitized. Its serum mixed *in vitro* with the protein endows the latter with the same toxic qualities that the protein can liberate when introduced into the hypersensitive animal. There is a mass of evidence to support the doctrine that an antibody to the protein has been formed. More than this, there appears to be sound reason

for the assumption that the newly acquired function of the serum in hypersensibility is a property of the globulin of the serum. Ehrlich's hypothesis of a specific side chain, a fresh molecular arrangement of a group normally attached to globulin, still has much to recommend it. It is only when the protein in substantial quantity is thrown into the circulating blood of the hypersensitive animal that there is a sudden disturbance of the normal equilibrium of the colloidal particles. The explosion, as it were, is caused by the antigen-antibody-complement reaction and the result is a great disturbance of the colloidal equilibrium with the mobilization of an enormous excess of hydrogen ions. The process involves cells as well as blood serum, so that a profound change is found in the cell membrane.

It is unnecessary to refer to the hypothetical substances such as anaphylatoxin of Friedberger, for while the immediate cause of the shock is a combination of protein, amboceptor and complement, the shock itself is due not to an actual toxicity of the combination, but to the physical condition of its colloids.

### Current Comment.

#### LINITIS PLASTICA OR LEATHER BOTTLE STOMACH.

ALTHOUGH medical investigators had for many years recognized a pathological condition of the stomach in which the organ becomes much thickened and shrunken by the advent of fibrous tissue, it was William Brinton who described this remarkable lesion in 1854 under the name *linitis plastica*. Brinton collected a series of cases in which the patient complained of vague gastric symptoms. The condition lasted for many years and was attended by considerable malnutrition. At autopsy the stomach was found to be small and shrunken and its walls were so tough that it cut with a creaking sound. The cut surface was seen to contain glistening strands of fibrous tissue which recalled the appearance of woven linen. It was this appearance which suggested the name "linitis." He regarded the condition as being caused by an inflammation of the filamentous network of areolar tissue ensheathing the vessels. Other observers including Hanot and Gombault have supported Brinton's view of the inflammatory nature of the condition. Many, however, hold that the growth is malignant in nature. Bennett in fact goes so far as to state that pathologists are in agreement that the condition is one of sclerosing fibro-carcinoma of very low malignancy.

Ewing gives a good description of the appearance of the affected organ. He points out the stomach is much thickened and contracted. The lesion begins in the pylorus and may be confined to this region or to one of the two curvatures. From its point of origin it extends over a whole or part of the stomach and occasionally to the duodenum. He points out that the pyloric orifice projects into the duodenum as the *cervix uteri* does into the vagina. It is well to add that a similar condition has been described in the lower portion of the ileum, in the colon and in the rectum. Bland Sutton described a case of *linitis plastica* in which the colon lying in intimate contact with the stomach was involved in the process. He attached great importance to this from the point of view of the malignant nature of the growth. The thickness of the stomach wall may become four to eight times that of the normal organ. The new tissue is found chiefly in the *tunica submucosa* and the *tunica muscularis* is much thickened. It is seen to be traversed by oblique bands of fibrous tissue. The mucosa is usually thrown into folds or nodular elevations or it is thin, eroded or ulcerated. The pylorus may become fixed by adhesions and fibrous areas may be seen in the liver and spleen.

Dr. A. H. Aaron and Dr. J. V. Wadsworth have recently described a case of plastic linitis.<sup>1</sup> The patient was a male, aged thirty-one years. He was admitted to hospital in July, 1924, complaining of pain and a lump in the pit of the stomach, vomiting, weakness, loss of weight and anorexia. In 1912 he suffered from a venereal infection which was regarded and treated as syphilis. In 1917 he complained of symptoms suggestive of gastric ulcer. These symptoms gradually became worse, vomiting occurred and finally a mass was noticed in the epigastrium. After X ray examination had been carried out a gastrostomy operation was performed; no improvement resulted. The gastrostomy opening was closed and a jejunostomy was carried out. The result was unsatisfactory. At length partial gastrectomy was performed and the duodenum was united to the cut end of the stomach. In spite of the thickening of the stomach walls no difficulty was experienced in obtaining a secure suture line. Two days after operation gastric retention occurred and the patient died. No autopsy was obtained, but the statement is made that no metastatic tumours were visible or palpable at any of the three operations.

Sections of tissue removed at operation were submitted to microscopical examination. In tissue removed from the greater curvature at the first operation the submucosa was three or four times the normal thickness. It consisted throughout of dense fibrous tissue bundles coursing in all directions and invading the muscle coats. This fibrous tissue was in places richly nucleated. In sections from the pyloric regions the fibrous tissue of the submucous layer was densely woven and moderately well nucleated. In addition there were found widely scattered cells lying singly or in small

<sup>1</sup> Bulletin of the Buffalo General Hospital, April, 1925.



groups rarely touching each other as in epithelial union. The cells were roundish, oval or irregular in shape and contained nuclei of varying size and shape. The cytoplasm was usually clear and no distinct membrane was present. Sometimes the cytoplasm was represented by a large vacuole surrounded by a cell membrane. Drs. Aaron and Wadsworth state that these cells had a degenerated character and that the degenerative changes in the cytoplasm were of a mucoid nature. They state that the nature of the cells could not be definitely ascertained, but that they were strongly reminiscent of epithelial cells found in certain forms of carcinoma of the stomach, especially in the so-called Krukenberg carcinoma. They point out that these cells which supposedly represent the cancer elements in *linitis plastica*, are not universally regarded as cancerous. Some authors have claimed to have traced a connexion between these cells and the overlying epithelium. Others have claimed that the cells are endothelial in origin and that the tumour is an endothelioma. Bland Sutton in discussing localized fibrosis of the stomach concluded that the condition predisposing to *linitis plastica* is an ulcer in the mucous membrane which permits the connective tissue planes of the stomach to be permeated by infective agents associated with the ulcer and that the new connective tissue grows in response to the irritation caused by them. He further distinguished a condition of leather bottle stomach produced by malignant disease and said that a cancerous focus in the gastric mucous membrane (probably a gastric ulcer which had become malignant) allowed epithelial elements to permeate the connective tissue plane of the stomach. Dr. Aaron and Dr. Wadsworth state that the case described by them is an example of a typical plastic linitis which one group of morphologists would regard as carcinomatous and another as non-carcinomatous. They hold, however, that the basic process is a carcinoma of the stomach. They conclude that there appears to be no definite proof of the existence of a true linitis in the sense that the term was used by Brinton. It is probably correct to state that the onus of proof rests with those who would claim the existence of a non-malignant linitis.

#### THE USE OF IRON AND BLOOD TRANSFUSION IN SECONDARY ANÆMIA.

THE use of inorganic salts of iron in secondary anæmia has become almost a routine with a large number of practitioners. That certain beneficial results are sometimes obtained cannot be denied. At the same time it is very doubtful whether the benefit derived is brought about by the direct absorption of any of the iron. Many competent observers assert that inorganic salts of iron are never absorbed from the intestinal canal. Bunge held that iron given by mouth is recoverable in the faeces as sulphide of iron and that owing to this combination the iron organically combined in the food can be absorbed and utilized. Robertson

on the other hand maintains that inorganic salts of iron can be absorbed. He states that if mice are fed on milk alone for a considerable period, very slight trace of iron can be found in the alimentary canal of the animals. If inorganic salts of iron are added to the diet and the tissues of the intestine are examined under the microscope, little granules of iron are found imbedded in the protoplasm of the intestinal epithelium and leucocytes are found laden with minute particles of the metal. Robertson adds at the same time that it is one thing to show that inorganic salts of iron are absorbed and another to show that they may be utilized in the building up of hæmoglobin. Those who hold that inorganic iron is not absorbed, point out that if manganese is given to a patient suffering from secondary anæmia, manganese sulphide is recoverable in the faeces and that the organically combined iron in the food is more readily absorbed and the hæmoglobin value of the blood is increased. The use of inorganic salts of iron in secondary anæmia has recently been discussed by Dr. Martin Lewis Janes and its value as a therapeutic measure has been compared with blood transfusion.<sup>1</sup> He refers to the work of Whipple, Hooper and Robscheit on the regeneration of blood in anæmia due to hæmorrhage. These workers held that inorganic iron in the form of Bland's pills and arsenic in the form of Fowler's solution has little or no effect on blood regeneration without proper diet and they came to the conclusion that it was unjustifiable to assume without positive proof that inorganic iron is of value in the treatment of simple anæmia. Dr. Janes's observations were undertaken with the object of determining whether or not the conclusions of Whipple and his coworkers hold good in regard to secondary anæmia in general. He studied the results of treatment in ten patients. No special diet was ordered, but the patients were instructed to eat their usual food. After the administration of iron and arsenic for thirty days an average increase of 5% in hæmoglobin value and a gain of 200,000 in the red cells was found. This increase is regarded as being accounted for by the human shortcomings in determining the calculation. Thirty days after blood transfusion the hæmoglobin had increased by 21% and the number of red blood cells by 800,000. These observations are regarded as confirming the findings of Whipple.

It is questionable whether Dr. Janes is justified in forming conclusions in regard to these drugs on observations covering so short a period. Moreover, it is but natural that after three blood transfusions in the same limited period immediate improvement would take place. Dr. Janes does not state whether this improvement was permanent. The observations were carried out on the same patients and he does not state what interval of time was allowed to elapse after the drug treatment before blood transfusion was carried out. If the work of Bunge is correct, much improvement with iron and arsenic could not be expected unless the patient was put on a suitable diet.

<sup>1</sup> The American Journal of The Medical Sciences, April, 1925.

## Abstracts from Current Medical Literature.

### GYNÆCOLOGY AND OBSTETRICS.

#### Heart Disease in Pregnancy.

W. FREY (*Klinische Wochenschrift*, March 26, 1925) after describing the effect of pregnancy on the cardiovascular system gives the end results in forty-nine cases. In forty-one the termination was normal, one patient died suddenly, in three abortion had to be carried out and four gave up attending. Two of those whose pregnancies were terminated, died within three years, and two who had normal confinements, died a little later. On the whole the prognosis of married women with cardiac lesions is no worse than that of married men. Of great importance in prognosis is the character of the lesion—a chronic valvular lesion is safe as compared with one to which is superadded an acute endocarditis. On the whole mitral stenosis is of most serious import. The prognosis of myocarditis during pregnancy is always bad.

#### Kielland Forceps.

R. ZIMMERMANN (*Klinische Wochenschrift*, March 26, 1925) gives his experience with the Kielland forceps. He considers that the ordinary forceps are sufficient when the head is low down in the pelvis. The advantage of the Kielland instrument is in the high application of forceps and for malpresentations. The absence of a pelvic curve and the slender blades are of great benefit in these cases. The technique of application needs some practice and the author goes into considerable detail. In unskilful hands there are considerable risks of damage to the maternal soft parts. The forceps are more suitable for the specialist than for the average practitioner.

#### Vaccine Therapy in Gynecology.

C. BUCURA (*Wiener Medizinische Wochenschrift*, January 31, 1925) states that the main indication for vaccine therapy in gynecological conditions is gonorrhoeal infection. It is useless when the gonococci lie near the surface, but if it be supplemented with thorough local treatment of the cervix, urethra and Bartholin's glands, success will be obtained. It is indicated also when the infection arises from the skin, bowels or bladder. The author starts with two hundred and fifty million organisms in a pure gonococcal vaccine and if no reaction occurs, he doubles the dose in two to three days. If reaction is present, the same dose is repeated after the subsidence of symptoms and the doses are gradually increased to two thousand millions. In all cases of chronic salpingitis a gonococcal vac-

cine is first tried. If this fails, then a mixed vaccine comprising gonococci, staphylococci, streptococci and *Bacillus coli* is employed. The use of gonococcal vaccine in non-gonorrhoeal inflammatory lesions is harmless as it acts as a non-specific protein. The vaccine is also used as a prophylactic measure before operation on any suspected inflammatory lesion. If reaction occurs, it is repeated until none is obtained. If no reaction takes place, the operation may be performed without any fear for the patient. During pregnancy especially in the presence of pyelitis and salpingitis vaccine treatment will prevent a flare up during the puerperium. The reaction generally occurs within eight to twelve hours when the vaccine is injected subcutaneously or intramuscularly and within one to three hours if given intravenously. In some resistant conditions the author has tried direct injection into the cervix. This was followed by a severe reaction, but ended in cure. Finally he states that as vaccines can deal only with the active components of the inflammatory process, they cannot be expected to cure anatomical changes in the organs due to the inflammation; for this surgical treatment is necessary.

#### Transposition of the Ovary into the Uterus after Salpingectomy.

THEODORE TUFFIER (*Surgery, Gynecology and Obstetrics*, October, 1924) reports a series of twenty-three operations in which he has transposed the ovary after double salpingectomy in such a way as to leave it in the uterine cavity with its vascular pedicle intact. The objects he had in mind were to retain menstruation and to give a chance of fertilization. An ovary which was in this position for nine months, was examined histologically and found to be studded with corpora lutea over the part projecting into the cavity of the uterus. The uterine mucosa was normal throughout, but round the ovary it was tending to show benign adenomatous change. Among twenty-three patients there were no deaths.

#### Tuberculosis of the Female Genitalia.

W. WEIBEL (*Wiener Medizinische Wochenschrift*, March 14, 1925) states that the Fallopian tubes are the usual site of tuberculous infection in tuberculosis of the female genitals. The uterus is generally affected at the same time and more frequently in the body than in the cervix. Infections of the ovary and external genitalia are much more rare. The condition usually arises during the child bearing period and especially about puberty. Infections of the ovary are usually direct; those of the tubes from the peritoneum or to a lesser degree by the blood stream. The uterus is involved by a spread from the tube. In the vagina direct

infection or by the blood stream plays the main part, while the vulva is largely involved by a spread from the intestine or urinary tract. The author maintains that radiotherapy can frequently supplant operation. It is especially indicated in patients with generalized infection and in those with extensive pelvic involvement, especially plastic peritonitis. The mortality after operation is about 10% and there is always the risk of fistula formation. The shock of the operation and the effect of the anæsthetic on the lungs have also to be taken into consideration. The use of X rays obviates all this and they should be employed in small doses at four to six weekly intervals. Free ascitic fluid and collections of pus in the pelvis are contraindications to radiation. Radiotherapy may be used as a prophylactic measure after operation whether the organs have been totally or only partially removed.

#### Vaginal Cysts.

LEE M. MILES (*Surgery, Gynecology and Obstetrics*, March, 1925) reports a series of observations on vaginal cysts seen by him in Pekin Union Medical College. He saw five cysts, one being an inclusion cyst of the vaginal mucosa and four probably cysts of Gärtner's duct. In cysts of Gärtner's duct the epithelium shows great degrees of variation as to form and structure, in no two cysts is the epithelium alike, while in the same cyst different forms of epithelium were found in two cases. He saw no traumatic cysts in Chinese women. In three of the four cases of cyst of Gärtner's duct the cyst did not appear till after pregnancy and in one case the presence of a cyst developing during pregnancy affected the course of the labour. The diagnosis of cysts of the vagina cannot be made in all instances from the histological picture alone, but the exact location of the cyst must also be taken into consideration.

#### Ovarian Transplantation and Dementia Præcox.

P. SIPPEL (*Klinische Wochenschrift*, February 26, 1925) states that in many cases of dementia præcox there is definite genital hypoplasia. He gives the details of six patients, aged from eighteen to twenty-four years, on whom homoplastic ovarian transplantation was performed with uniformly successful results. The uterine mucosa was completely functionless in five patients and in all of them the ovaries manifested no corpus luteum formation. Ovarian tissue was obtained from patients who were suffering from carcinoma of the cervix and the grafts were implanted between the muscle and fascia in the prevesical fossa of the dementia præcox patients. Definite improvement both as regards the general condition and menstruation occurred within two to four weeks and the patients were discharged cured in three to four months.

### Stenosis of the Vagina.

H. PETERS (*Wiener Medizinische Wochenschrift*, February 21, 1925) gives the history of a woman who had an adherent placenta requiring manual removal. At the time laceration of the vagina was noted, but no repair was performed. The puerperium was normal. Five months later she complained of dyspareunia with slight hæmorrhage. On examination a band of scar tissue was found completely surrounding the vagina about the middle and permitting only one finger to be passed through it. While the injury may have been due to foetal pressure during labour, it was much more likely to have been caused by trauma during the manual removal of the placenta.

### NEUROLOGY.

#### Encephalitis Periaxialis of Schilder.

JAMES COLLIER AND J. G. GREENFIELD (*Brain*, December, 1924) report two cases of *encephalitis periaxialis*, first described by Schilder in 1912 and distinguished from among the several conditions which had been reported as "diffuse sclerosis" of the brain. The clinical aspect divested of details is as follows. It is a malady usually occurring in children and young subjects. It has no known causal factors or antecedents. The onset covers a few days, the course is progressive with some remissions to a fatal issue, the duration from a few months to three years. The chief early sign is cerebral blindness which becomes complete, to which is added mental reduction and increasing spastic paralysis. Unsteadiness from parietal involvement and deafness from temporal involvement may be conspicuous. The amentia increases and passes into coma which terminates the illness. The condition, usually bilateral, may commence on one side or may be confined to one side. The pathological picture well explains the symptomatology. It is that of a massive affection of the white matter of the cerebral hemispheres, considered to be toxic in origin and inflammatory in nature and characterized by the disappearance of the myelin, the axicylinders remaining for a long time intact, though these eventually perish, with comparatively little lymphocytic exudation and not very conspicuous glial reaction. This affection, beginning bilaterally in the white matter of the occipital lobes, spreads forward through the white matter by contiguity. It spares the cortex and the subcalcarine arcuate fibres and the basal ganglia, either completely or at least for a long time. It advances throughout the white matter of the hemispheres and may descend to the capsules, crura and pons. Last of all it affects the white matter of the frontal and temporal poles and according to

the stage of the disease at which death occurs, these regions may be either completely spared or affected to a lesser or greater extent. (In the same number of *Brain* may be found an account of two other cases of this disease by L. Bouman of Amsterdam.)

#### Organic Epilepsy Considered from the Standpoint of Cerebral Localizations.

ALFRED GORDON (*Journal of Nervous and Mental Disease*, February, 1925) takes as his thesis the wide variety of lesions which may give rise to focal epilepsy and in a series of thirty-three cases found the following lesions: Hæmorrhage in the subcortical frontal tissue; softening more or less extensive in the basal ganglia and internal capsule; ventricular hæmorrhages; hæmorrhage in the occipital lobe; tumours in the cerebellum, in the cerebello-pontile angle, in the pituitary gland; dilatation of the lateral ventricles; ependymitis; thrombophlebitis in the orbital lobe; purulent meningitis. These findings go to show that convulsions may occur from irritation not only of the motor cortex, but also of subcortical centres, medulla and pons. The latter contention finds its corroboration in the production of convulsions by medullar convulsants in decerebrated animals and in cases of anencephaly. Luce also writes of convulsions in pontine hæmorrhage. The cerebellum is likewise known to be the point of departure of convulsive seizures. The same may be said of ventricular irritation in the absence of other lesions and of tumours of the base. If consideration is given also to many other lesions in various portions of the cerebrum, between its anterior and posterior poles, at its base, over the vertex, in its interior, the view is justified that epilepsy of the Jacksonian type may occur in a great variety of organic lesions of the central nervous system irrespective of the site of irritation. The assumption is, therefore, that all segments of the brain possess epileptogenous properties and that the mechanism of epileptic convulsions lies fundamentally in the disturbed function of the cortical motor cells, the impulses of which are influenced by morbid foci in any region of the intracranial tissue.

#### The Treatment of Encephalitis Lethargica, Especially Parkinsonism.

FÉMETRE EM. PAULIAN (*Revue Neurologique*, January, 1925) first enumerates the various remedies tried without success in *encephalitis lethargica*; thus, "Urotropine," by mouth or intravenously; cacodylate of soda, subcutaneously; bismuth, colloidal gold, adrenaline, salicylate of soda, intravenously; protein therapy and finally injections, intraspinally, of horse serum and other substances. He goes on to say that in Professor

Marinesco's clinic, at Bucharest, more than thirty patients with chronic encephalitis, often of Parkinsonian form, have been treated with encouraging results by the intraspinal injection of an autoserum. In the beginning they used a preliminary intravenous injection of "Urotropine," but soon abandoned this as unnecessary. The present proceeding is to withdraw forty to fifty cubic centimetres of blood and inactivate the obtained serum at a temperature of 56° C. Of this serum ten to fifteen cubic centimetres are introduced by lumbar puncture, the patient being kept recumbent for twenty-four hours thereafter. Hitherto there have been no harmful results. From three to six injections according to the severity of the case are recommended. The rationale of the treatment remains obscure.

#### Facial Associated Movements.

ARNOLD CARMICHAEL AND MACDONALD CRITCHLEY (*Journal of Neurology and Psychopathology*, August, 1924) remark that the best known example of facial associated movement is the "jaw winking reflex" described by Marcus Gunn and others. They proceed to consider other examples, six types in all: (i.) An "oculo-aural" movement; on extreme lateral deviation of the eyes there may be noticed a rotary movement of the helix of the pinna. (ii.) An "oculo-frontalis" movement. This consists of elevation of the homolateral eyebrow with depression of the contralateral brow upon outward ocular deviation. This and the oculo-aural movement may occur as a kind of nystagmus. (iii.) An "oculo-lingual" movement. If the mouth be allowed to hang open and the eyes be strongly deviated to one or other side, in many cases the point of the tongue turns over to the homolateral side. (iv.) An "oculo-nasal" movement was observed once only, in a case of *tabes dorsalis*. Lateral deviation of the eyes resulted in wide dilatation of both nostrils. (v.) An "oculo-mandibular" movement was noted in one case of hemiplegia. When the jaw was allowed to drop and the eyes rapidly turned from side to side, the point of the chin became protruded and deviated in the opposite direction to the eyes. (vi.) An "orbiculo-stapedial" movement. A student of singing exhibiting a strong blepharospasm of the right eyelid complained of buzzing in the homolateral ear while singing or listening to a high note. After discussing these movements from the anatomical, developmental and phylogenetic standpoints, the authors conclude that it is probable that the movements are relics of a more specialized mechanism in animals, used both for protective and utilitarian purposes. Nystagmus both of the frontalis muscle and of the ear is of pathological significance and may be of diagnostic value.



## British Medical Association News.

### SCIENTIFIC.

A MEETING OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the B.M.A. Building, Albert Street, East Melbourne, on June 3, 1925, Dr. H. DOUGLAS STEPHENS, the Vice-President, in the chair.

#### Immunity.

PROFESSOR PETER MACCALLUM delivered an address entitled: "Immunity" (see page 127).

DR. W. J. PENFOLD in opening the discussion expressed the very great interest with which he had followed Professor MacCallum's admirable review of the general facts of immunity in a paper which would bring them all up to date.

He wished to direct his remarks not so much to the general question as to one or two practical aspects.

Professor MacCallum had indicated that therapeutic sera were of great value only in those diseases in which the causal organisms elaborated exotoxins. While this was generally true and was illustrated by the efficacy of antidipteric serum, in the case of tetanus, a disease produced by another exotoxic organism, serum therapy was not so successful. He (Dr. Penfold) considered that the relative lack of success attending the use of therapeutic antitetanic serum was due to the fact that the diagnosis of tetanus was made relatively late; the toxin had become fixed in the tissues of the central nervous system and apparently could not be dislodged. The results shown in Sir David Bruce's analysis of the case records of tetanus patients treated by antitetanic serum during the war were disappointing and suggested that a 15% to 30% case mortality was to be expected in spite of serum treatment. Grieve, Stanton, Southby and Stokes had reported from the Children's Hospital, Melbourne, four instances of recovery from tetanus and four or five recoveries were reported from the Ipswich Hospital. In all the therapeutic measure relied upon was the repeated administration of large doses of antitetanic serum. In Western Australia, however, five subjects of tetanus were recently reported to have died although treated with moderate amounts of serum, but in none of these could the specific treatment be said to have been commenced sufficiently early in the course of the disease.

It was perhaps unnecessary to point out that the value of diphtheria antitoxin diminished with each day that it was withheld. When the serum was administered on the first day of the disease, the mortality rate was 0.4%; when the first injection was given on the second day the mortality rate was 5% and after several days had elapsed antitoxin was of comparatively little value.

These facts were to be considered in assessing the utility of antibacterial sera. They might consider typhoid fever was an example for purposes of discussion.

Generally speaking the diagnosis of typhoid fever was delayed until such time as the patient's own antibodies were sufficiently developed to enable the agglutination (Widal) reaction to be obtained with his serum and few practitioners made the diagnosis of typhoid before the tenth day. By the adoption of routine blood culture the diagnosis could be established on the second, third or fourth day and at such an early stage an antibacterial serum might be used effectively. What might be achieved in this direction could not be known until prompt diagnosis was secured.

Dr. Penfold said that he had recently visited a hospital, not provided with an experienced bacteriologist, in which were about thirty patients suffering from enteric fever. He ascertained by inquiry that hæmoculture had been performed in nineteen instances and of the three successful blood cultures one had taken four days to develop. Here was a loss of time which might have been obviated by the use of ox bile, bile broth or tauro-cholate broth in place of the plain broth employed as culture medium.

He believed that such occurrences were very common in hospitals. Immunological and bacteriological work was almost entirely neglected when it ought to be the first concern not only of the pathologist, but of the physician.

In the epidemic to which he had referred, only about half of the patients had manifested an agglutination reaction although the sera had been tested against typhoid bacilli and paratyphoid bacilli A and B. Had the blood culture work been prompt and effective, it might have been shown that some other organism was responsible for the "enteric" condition.

As serum producers the Commonwealth Serum Laboratories received reports regarding the efficacy of different sera, but such reports were practically never based on immunological observations at the hospitals. He would urge some such observations as the following: In the event of the isolation of a streptococcus, for example, the powers of each of the antistreptococcal sera issued by the Laboratories and by other producers to protect mice against the strain should be ascertained and compared. That which was most effective in the mouse, should be employed and a culture of the streptococcus forwarded to the laboratories with a note regarding the batch numbers of the sera investigated.

In chronic infections it might be determined that the patient's serum itself was rich in antibody content, for instance, 0.2 cubic centimetre of patient's serum might protect a mouse against a number of fatal doses of the organism recovered from the patient. In such a case probably little was to be gained by injecting horse immune serum.

Dr. Penfold next discussed briefly the serum treatment of pneumonia. Miss Warner in a paper presented to the last session of Congress had recorded that of fifty-five subjects of lobar pneumonia, due to Type I. pneumococcus, in the treatment of whom no serum was employed, eleven had died, a mortality rate equivalent to 20%. On the other hand, of fourteen patients with pneumonia in whom the infecting organism was determined as pneumococcus Type I. and for whom Type I. therapeutic serum was employed, only one had died. Tebbutt had recorded fifteen instances of serum-treated Type I. lobar pneumonia among which one death had occurred. So that of twenty-nine patients affected with pneumonia determined to be due to pneumococcus Type I. and treated by the appropriate serum two only had died; this was equivalent to a percentage mortality of 6.8, which he claimed was as good as the results obtained in America.

He considered the identification of every Type I. pneumonia was the bounden duty of the physician in attendance, for about two-thirds of the deaths resulting from it could be prevented by serum treatment.

It was unfortunately true that therapeutic sera prepared against pneumococci of Types II. and III. did not approach that of Type I. in efficacy, but at the same time it was not yet quite wise to deny patients possible benefits from these sera.

Observations in Australia had shown that Type II. pneumococcus was not responsible for much pneumonia, but Type III. was by no means negligible.

He was still of opinion that monotypical sera should be prepared in the hope of doing some good by their means.

At the Commonwealth Serum Laboratories they had analysed one hundred and eight strains of Australian pneumococci with respect to serological type and had found that the various types were distributed as follows: Type I., 37; Type II., 7; Type III., 19; Type IV., 10; Type V., 5; Type VI., 4; Type VII., 3; Type VIII., 2; Type IX., 2; Type X., 2; Type XI., 2; Type XIV., 2; Type XIX., 2.

Several types had been found only once in the one hundred and eight strains and could at present be neglected.

Types I., II. and III. corresponded with the American types similarly designated and the remaining types represented subdivisions of the American heterogeneous group.

He submitted that 90% of pneumococcal infections in Australia could be specifically treated by the preparation of five separate sera:

I. A serum against Type I: pneumococcus, which occurred thirty-seven times in one hundred and eight strains.

II. A serum against Types II. and IV. which together accounted for seventeen out of one hundred and eight strains.

III. A serum against Type III., represented nineteen times in the one hundred and eight strains.

IV. A serum against Types V., VI. and VII., distributed among which there were twelve strains.

V. One serum against the six types of each of which there were two representatives in the series.

It would be possible by the intraperitoneal inoculation of a mouse with the patient's sputum to arrive within eighty hours at some conclusion regarding the type of the infecting pneumococcus and the suitability of one of the five sera. He felt very strongly that effort in the direction of earlier diagnosis of the type was needed if the maximum benefit was to be obtained from antibacterial serum therapy. It was not to be expected that the laboratories would produce these extra sera so long as practitioners would not use Type I. serum, which was already available and known to be valuable.

Dr. Penfold briefly discussed the antigenic components of the pneumococcus. He believed that in the pneumococcus there was a characteristic nucleus to which were added various specific groups accounting for the types. Protection of the monkey by living vaccine of Type I. also conferred some degree of protection against other types. Tebbutt had described types which were not specifically agglutinated by any one monovalent serum, but were partially agglutinated by two such sera, and such types had been met with frequently in France. Laboratory strains on prolonged cultivation were prone to lose their type specificity and to agglutinate with the sera of other types although they did not agglutinate with normal serum.

Huntoon had been working for some time on the essential nature of the antibody in antipneumococcal serum and it was probable as a result of his and similar work that therapeutic products would result of much better quality than the unconcentrated sera previously available.

Variations in virulence of the organisms employed in the immunization of animals for the production of antisera constituted a difficulty. This might have been exemplified by the experience of Rowlands who had prepared an antiplague serum by the use of cultures of *Bacillus pestis*. Though extremely virulent for rats, this serum gave rise to antibodies which were ineffective in treatment when passively transferred to man. The plague bacillus virulent for the rat might not be the same as the plague bacillus in its most virulent state or states for man.

Dr. Penfold asked Professor MacCallum if he had any suggestion relating to the reaction which occasioned the fatal shock induced by the intravenous injection of animals with distilled water and bacteria. The introduction of either bacteria or distilled water alone would not kill the animal, but the combination was lethal, even when the distilled water was injected into one ear vein and the bacteria into the other. Was the fatality determined by oscillations in the hydrogen ion concentration of the blood?

In this connexion he was prompted to say that protein shock in the treatment of disease should be used with great caution. He had received a report of a fatality ensuing upon the intravenous injection of "T.A.B." vaccine as a therapeutic measure in a patient mildly ill of typhoid fever. Death had occurred within two hours of the injection. This catastrophe had happened in Victoria and he had knowledge of a similar one which occurred in New South Wales.

The views based upon colloid work put before them by Professor MacCallum were very interesting, but he considered that they did not explain the specificity of immune reactions. He thought that chemical conceptions, although they left many reactions obscure, provided still the best hypothesis.

There was at the present time a considerable demand for antidiphtheritic serum of low potency in large amounts

for oral administration. It was apparently being used extensively by physicians who were very pleased with the clinical results.

Could Professor MacCallum advance any reason for such a serum being of value?

DR. D. MONTGOMERIE PATON spoke of the oral administration of low potency antidiphtheritic serum. He dealt with the action of the secretion of the ductless glands. He advocated the use of these secretions and of antidiphtheritic serum to wounds.

PROFESSOR W. A. OSBORNE said that he had come to learn and had not anticipated speaking. Though he had had a very tiring day he became wide awake when Professor MacCallum proceeded to discuss the later theories of immunity based on studies in the physical chemistry of colloids. In this field Professor MacCallum himself had contributed actively and his papers had brought him distinction, but he had quite too modestly avoided mention of his work in his address.

He had always been interested in the manner of application of physico-chemical laws by those who tried to explain everything according to their own particular theories. Arrhenius endeavoured to bring toxin-antitoxin reactions into the same category as those between acids and alkalis, subject to the laws of mass action. It would perhaps be recollected that the late William Bayliss applied the principles of adsorption to the explanation of immune reactions.

He spoke with diffidence, but suggested that these attempts were short cuts which failed in that they did not explain the essential specificity of immune reactions. It appeared that every individual had his own particular protein molecule which was as distinctive for him as his character or his handwriting.

DR. F. TRINCA said with reference to the administration of low potency antidiphtheritic serum by the mouth that he had recently been occasioned much anxiety by two children who were extremely ill as the result of septic infection of the throat.

In both he prescribed antidiphtheritic serum to be given orally and the improvement in both children within twenty-four hours of their taking ninety cubic centimetres of the serum in this manner had been remarkable.

DR. R. J. BULL said that Professor MacCallum had given them a very interesting summary of present day conceptions in regard to the subject of immunity. Although a great many facts had been determined, there still appeared to be missing links in the chain of reasoning upon which the interpretation of those facts depended.

It always seemed to him that the combat between the human being and invading microorganisms was unfair. Bacteria were very adaptable and multiplying as they did at the rate of a generation every twenty minutes, could travel a long way and make very rapid progress in suiting themselves to their environment in the course of two or three days.

Dr. Penfold had discussed in some detail the serotherapy of pneumonia, but he would like to know to what extent pneumococcal vaccines had been employed. He recollected various instances in which small doses at frequent intervals of a stock pneumococcal vaccine had been used with advantage.

Dr. Penfold's remarks on the utility of blood culture in the early diagnosis of typhoid fever reminded him of a recent and somewhat unusual experience. In general he did not expect to cultivate the typhoid bacillus from the blood at the stage of the disease at which the agglutination reaction was well developed. Quite recently, however, he had examined the serum of a patient yielding a strong Widal reaction and from less than one cubic centimetre of the same individual's blood he had obtained a culture of the typhoid bacillus. Evidently the organisms were present in the blood in large numbers and he thought it was not often that the bacteriemia and agglutination reaction in typhoid exhibited such parallelism.

They were indebted to Professor MacCallum whom they were delighted to welcome as a member of the Victorian Branch of the British Medical Association.

DR. A. J. TRINCA asked if the phenomena of anaphylaxis were to be explained on the basis of variation in the hydrogen ion concentration of the blood and in that event what was the mode of action of adrenalin in warding off dangerous manifestations.

He could not see that serum when given by the mouth could exercise any specific action and was disposed to think that any benefit which accrued to the patient was due to the fact that he had been given very easily digestible protein in the form of serum albumin and globulin. This could be achieved by supplying an equivalent quantity of egg white.

DR. A. P. DERHAM related a recent experience of alarming anaphylaxis in a child to whom he had given a minute dose of toxin-antitoxin mixture. The startling symptoms had abated after the injection of adrenalin.

PROFESSOR MACCALLUM in reply said that he agreed with Dr. Penfold that the time factor in the administration of therapeutic sera was intimately related to the amount of benefit to be anticipated. That good therapeutic results depended on early administration of serum was clear from the abundant records of the efficacy of antiphtheritic serum when used at the outset of the disease and from the proved prophylactic utility of antitetanic serum.

He wished to support Dr. Penfold in his general remarks regarding the proper use of laboratory facilities and in his insistence that clinicians should be fully conversant with the scope of the assistance to be derived from the laboratory.

The work of Huntoon in the refinement of antipneumococcal sera was very interesting. To attain an exalted antibody content and a minimum of sero-protein had always been a difficulty in the preparation of therapeutic sera. Huntoon's experiments were still *sub judice*, but it was probable that the adoption of his methods would result in the preparation of more potent antibody solutions.

The experience of Rowlands with plague serum, referred to by Dr. Penfold, was another example of the disappointment which not infrequently ensued upon the application of experimental observations on animals to man. It might be that one factor operating was the existence of varying serological types of the *Bacillus pestis*.

He thought that Dr. Penfold was best able to advance an explanation of the phenomenon of fatal shock which ensued upon the intravenous injection of distilled water and bacteria in animals since he was primarily responsible for its first observation.

There was no doubt that caution was necessary in the use of non-specific protein shock therapy. The long schedule of diseases in the treatment of which this method had been recommended, included typhoid fever and asthma, but from the fact that asthma and the acute fevers were also to be found on the list of contraindications, it was evident that trouble had been experienced.

He thought that the highly specific reaction between antigen and antibody would ultimately be found to be a chemical phenomenon. When combination was effected between antigen and antibody the conditions of changes in electric charge, alteration in the structure of molecules or micellæ and consequent disturbances of hydrogen ion concentration were perhaps to be regarded as secondary physical phenomena. The principle of adsorption alone, a purely physical phenomenon, failed to explain satisfactorily the union between antigen and antibody.

With reference to the oral administration of non-specific serum Professor MacCallum said that he had had no experience of the use of serum in the manner described by Dr. Paton. He was disposed to regard it, however, as a form of non-specific protein therapy. He was doubtful if the conception of such a serum as a vehicle for endocrine secretions would bear experimental investigation. At the same time laboratory workers were bound to preserve an open mind on clinical observations. Serum as used in lacerated wounds by Dr. Paton might be efficacious by virtue of its natural antibody content.

Dr. Trinca had raised the question of the action of adrenalin in combating anaphylactic shock. He knew of

no specific action and could advance no explanation other than that of its selective action on plain muscle and the well known action of adrenalin in raising blood pressure in collapse generally.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the B.M.A. Building, 30-34, Elizabeth Street, Sydney, on May 28, 1925, DR. R. B. WADE, the President, in the chair.

#### Fractures of the Forearm.

DR. L. G. TEECE read a paper entitled: "Fractures of the Forearm: Their Non-Operative Treatment" (see page 132).

DR. ARCHIE ASPINALL read a paper entitled: "The Treatment of Compound Fractures of the Forearm" (see page 135).

DR. T. W. LIPSCOMB said that he wished to emphasize the point that the majority of patients with fracture of the forearm came under the care of the general practitioner. In consequence it was necessary to perfect simple methods of treatment that were suitable to most cases whether in the towns or in the bush. Anatomical knowledge was most essential in dealing with fractures. By this means the attendant could obtain a clear mental picture of the position at the site of fracture; he would know which muscles were acting at that particular level and which muscles might interfere with the proper alignment of the fractured bone. When a patient was seen with an injured arm every reasonable attempt should first be made to diagnose the lesion by the usual clinical methods and this should be confirmed later on by the radiographer; the reverse order should not be adopted. The medical attendant of every patient with a fractured arm should have the benefit of a radiogram if it was at all possible to have one taken. If owing to circumstances it was only possible to have one skiagram taken, this should be done shortly after the arm was "set," for that was the most favourable time for an attempt to correct a faulty alignment. They all knew the overwhelming advantage of a general anæsthetic in reduction of fracture and in the application of suitable retentive apparatus and manipulation under general anæsthesia should always be used in the endeavour to overcome deformity in forearm fractures and secure as accurate alignment as possible. It should be the exception for patients to come to the table for open operation. Such exceptions would include patients with fracture of the olecranon which needed suturing, and those with fracture of the upper end of the radius in which the detached fragment of bone usually had to be removed, and so on. In regard to splinting they were told by the general principles of fracture treatment that the joints above and below must be controlled; so it was that in fractures of the upper two-thirds of the forearm splinting should be devised to control the elbow as well as the wrist. For fractures such as those of the upper third of the radius, namely those above the insertion of the *pronator radii teres* muscle, needing a position of supination, a moulded posterior splint was most satisfactory. For those not adept in using plaster he warmly recommended poroplastic felt for it was a most convenient material with which to work.

For fractures of the middle of the forearm in which the optimum position of the arm was midway between pronation and supination, a well padded internal angular splint and a forearm external splint would be found most beneficial. At the same time it was always necessary to remember that the splints should be slightly wider than the forearm itself so that the webbing straps or strapping or bandages would not tend to approximate the ulna to the radius.

For fractures of the lower end of the radius of the Colles' or allied type with their typical deformity, not infrequently impacted and with the line of fracture usually oblique, it was as a rule advisable to use general anæsthesia for the attempt to reduce the deformity by manipulation. Manipulation should at all times be as gentle as possible so that no additional trauma would be added to the soft parts. Splints used in fracture of the



forearm should not extend beyond the level of the proximal palmar arch so as to allow freedom for the fingers.

At all times restoration of function of the limbs was the object sought and this was best obtained by early, judicious exercise of the muscles. It was preferable to have a good functioning limb with free movement, even though there might not be perfect alignment and though some thickening might be present at the site of fracture. For this reason he held that if there was any doubt as to when the splinting should be discontinued, it was better to leave off splints too early than too late in forearm fractures. With all the talk about plaster or poroplastic felt or fancy splints bearing an inventor's name nothing was of any avail unless proper reduction was first procured before the application of any apparatus.

With the nightmare of litigious patients ever before them no matter how much care and patience they might expend on a forearm fracture, medical practitioners should never neglect to seek the aid of radiography and of general anaesthesia, they should first and foremost be financial members of a defence organization and should also warn the patient's nearest relative of the possibility of some limitation of function following the fracture. To his friends in general practice he would say: "In difficult cases such as fracture combined with dislocation, comminution, difficulty in obtaining alignment, much confusion of soft parts and so forth send the patients to hospital where they can have more efficient supervision and where repeated X ray examination can be made."

Dr. Aspinall's remark that patients with compound fracture of the forearm frequently had some other injury or condition in another part of the body recalled to his mind the striking example of such. Many years previously when Lewisham General Hospital was purely for women and children, a bottle collector had been thrown out of a cart in front of the hospital. He had skidded along the roadway and had fractured his arm, he had sustained numerous abrasions and a much "gravel rashed" face. He had been admitted into the private hospital for the night and a physician had attended to the arm temporarily. The following morning the physician had seen him again with a view to further and more suitable attention to the fracture before he left the hospital. In doing this he had discovered anaesthesia along the distribution of the ulnar nerve. Dr. Lipscomb was in the hospital at the time and had been asked to see the patient. He had agreed that the ulnar nerve was severed and that it should be sutured without delay. He had cut down on the nerve, followed it in an upward and downward direction and had found it intact. He had looked upon the condition as a "concussion" of the nerve, had sutured the wound and put the arm in splints. The patient had spent two very restless days and nights and the splinting had not controlled the fragments, so he had arranged for the patient's admission to the Royal Prince Alfred Hospital with a view to operative treatment. On account of the patient's gravel-rashed face Dr. Lipscomb had not really seen his features, but he had called him by the name of a deceased, well known public man in the State who was to say the least very plain. At the Royal Prince Alfred Hospital the fracture had been plated and he understood that at that institution the ulnar anaesthesia had also been regarded as due to concussion of the nerve. Not until some time later had the appearance of the patient's face drawn attention to his condition; he was suffering from leprosy. Dr. Lipscomb was happy to state that the Medical Superintendent of the Coast Hospital had lately informed him that the patient did extremely well with chaulmoogra oil treatment, had been discharged from hospital and was earning his living.

Dr. N. D. ROYLE confessed that a few years previously he had been so scared by fracture of both bones of the forearm that he had subjected patients so affected to operation. He had then asked himself why redisplacement took place. There were two reasons. In the first place irritation resulting from the trauma set up reflex contractions and there was an attempt on the part of the

muscles to replace the bones in producing stability. The problem was to reduce the fracture and to keep it reduced. The most satisfactory splinting material was plaster of Paris. Since using the three plaster method at Lewisham Hospital he had not operated on a double fracture of the forearm. In regard to the technique of application and the question of fixation of the hand, he differed from Dr. Teece about the difficulty. It was essential not to use much padding and if any was used it should be merely some felt. In this way accurate fitting would be obtained. In applying the method the elbow and the hand were fixed. In reducing the fracture the operator pulled on these fixed parts. It was not necessary to worry about the position of the forearm. (He preferred supination.) The middle section was then applied. It was muscular action that caused redisplacement. After the middle section was applied there could be no muscular action. Another fact to be remembered was that when a fracture was put up in this way, as there was no necessity for muscular action there was no subsequent swelling. The tone of a muscle alone was not sufficient to displace a bone. In his paper Dr. Teece had not described any adequate way for obtaining extension. If adequate reduction was not obtained with the plaster, it could be divided, further extension could be made and more plaster could be applied over the line of division. He had in this way been able actually to produce separation of the bones. Dr. Royle knew of no other method which would produce these results except perhaps skeletal traction and in skeletal traction a pull was made against the attempt by the muscles to produce stability. In the after treatment of fractures of the forearm there was nothing to compare with active movements. Massage was not necessary, it set up reflex muscular action. It was his custom to leave the splint on for fourteen days. The plaster should be split and the movements of pronation and supination carried out, but the plaster should be used as a splint. In the treatment of children it was necessary to give support for a longer period than in adults as children were careless and a fall might refracture the bones.

Dr. D. J. GLISSAN said that the problem under discussion had not been solved. The treatment of these fractures was most difficult and only by comparison of methods would light be thrown on the subject. The important point was what were they aiming to get. They were aiming to get an upper limb whose function was restored. It had not been determined how much mal-alignment was consistent with good function. He thought that too much reliance could be placed on the results of X ray examination. Overriding of the fragments was not serious, provided they did not impinge on the interosseous space. Fractures which had shown a tendency to delayed union, were those which were associated with good anatomical alignment after operation. Dr. Glissan demonstrated some splints. He said that the splint should be made to fit the patient and not the patient to fit the splint. Aluminium splints could be boiled with instruments in case of operation and an X ray picture could be taken with the splint *in situ*. In dealing with fractures of both bones of the forearm he had latterly adopted a new method, but had not had sufficient experience of it to state definitely what the results would be. Dr. Glissan then described his method of combining aluminium splints with plaster of Paris. In regard to the after treatment he agreed with Dr. Royle that it was important that the patient should move his fingers. He should be shown how to do it as soon as the plaster was applied. Every movement of every joint of fingers and thumb should be employed. Adult patients were sometimes afraid to move their fingers.

Dr. H. SKIPTON STACY said that he was disappointed that Dr. Teece had not spoken more flatteringly of the three plaster method. He had only recent experience of the method, but regarded it as one of great promise. All the splints he had tried, were disappointing as regards the production and maintenance of extension. In fact they had no reason to be proud of the results obtained by the ordinary methods in cases where there was much initial displacement. Although it was certainly true that the

same exact anatomical reposition was not so necessary in the upper limb as in the lower owing to the absence of weight bearing, still he agreed with Dr. Teece that it was to be aimed at as much as possible, not he thought by frequent inspection and alterations, but by the application (whilst the patient was under the anaesthetic and the deformity was reduced) of some fixation method such as plaster of Paris, preferably the three plaster method. In fractures without much displacement, he agreed with Dr. Lipscomb that the old-fashioned, internal angular splint gave very good results.

Dr. Stacy pointed out that in compound fractures sepsis was less likely to occur when the puncture of the skin came from within than when produced by violence from without.

Dr. J. COLVIN STOREY, O.B.E., said that he always aimed at getting a perfect anatomical result. Good functional results were obtainable with imperfect anatomical results. The patient did not complain if the functional result was perfect or nearly so. Dr. Storey then described a wooden splint which he had devised. By this splint fixation was obtained at the elbow and extension could be applied to the distal extremity. In discussing the necessity for open operation, Dr. Storey referred to the case of a child in which reduction had been accomplished under anaesthesia after the third attempt. There had latterly been much unnecessary practice of operative interference. Open operation had been introduced by a man whose judgement was phenomenal and Dr. Storey wondered why he had not combined excision of the colon with plating of bones to insure more rapid healing of fractures. He did not agree with Dr. Aspinall in regard to the use of silver wire in compound fractures.

Mr. GORDON CRAIG said that he had been interested in the points of view of the several speakers. It was, however, strange that at a symposium on fractures of the forearm no mention had been made of Lucas Championnière's method and its antithesis Lane's open operation. He quite agreed with Dr. Royle's condemnation of massage, as it was ordinarily understood the use of massage was wrong. What was necessary could be easily done by the surgeon himself. Five minutes' active movement on the part of the patient was equal to many weeks of massage. He thought that Lane's open operation for fractures of this kind should be condemned. The method had been much in vogue ten years earlier, but in his opinion the results obtained were no better than with the non-open method. He had long discarded metal or wooden splints. It was his custom to use moulded plaster splints, made from plaster bandages. The bandage was folded backwards and forwards and was of a putty-like consistency when applied. No padding whatever was necessary and he found that the best results were obtained in this way. He thought that the three plaster method in Dr. Royle's hands was an excellent method and was probably one of the greatest advances in getting traction and countertraction yet devised. Mr. Craig then discussed the metal splint shown by Dr. Teece and expressed the opinion that it would be more useful if the metal part which was applied to the arm, was adjustable. He also described a somewhat similar splint of his own design. He saw no reason why as excellent results should not be obtained with the Schmerz hook in fractures of the arm as Dr. Corlette obtained with its use in fractures of the leg. Mr. Craig also pointed out that different considerations entered into the treatment of fractures in children as compared with adults. In children alignment was the main factor. Overlapping did not matter so much, for if serial skiagrams were taken over a considerable period of time, it would be found that the overlapping became obliterated. He had found that after a period of five years in fracture of the humerus new bone was laid down. Nature tended to adapt the architecture of the bone to the function it had to perform. Mr. Craig also referred to the man whose ulnar anaesthesia had been mentioned by Dr. Lipscomb. The man had been under his (Mr. Craig's) care at the Royal Prince Alfred Hospital. He had noticed the patient's leonine faeces and had asked Dr. Sinclair Gillies to see him. Dr. Gillies concurred in the diagnosis and the patient had been transferred to the Coast Hospital.

Dr. C. E. CORLETTE agreed with Mr. Craig in regard to the difference between the fractures of children and adults. In children some overlapping did not matter. In a few years the bone was a new bone and no trace of the injury could be found. In adults it was different and he was more inclined to open operation. He could not say that he had ever plated a fracture of the forearm. On the whole the results of open operation without plating were satisfactory. He had been surprised that in the discussion that evening no mention had been made of fractures of the Colles's type. These fractures caused most disability. If the closed method of reduction gave difficulty, he advocated the open method and the application of hooks to pull the fragments into position. It was not necessary to make a large incision. In fact it was sometimes not necessary to make an incision at all. The after treatment of Colles's fracture was simple. Splints hardly came into the question. Colles's fracture was unlike any other fracture of the forearm, the fragments when they were reduced would remain reduced and would stay where they were put. The wooden splint was much maligned. Any splint was suitable for a Colles's fracture, even a simple wooden board, this could be worn for a few days and then a sling was sufficient. In conclusion Dr. Corlette expressed his disapproval of the use of Thomas's arm splint when the ring was used for the purposes of countertraction. Countertraction should be obtained by the use of the weight of the body. This was easily done by raising the splint and using a weight and pulley for traction. In compound fractures in which plaster was unsuitable, he commended the method of applying a cotton glove with glue. Rings were sewn to the ends of the glove fingers and traction was applied to the rings.

Mr. E. T. THRING said that the treatment of fractures was not in his domain and he asked what was the general feeling in regard to the use of medullary pegs. Was it a wise thing to use pegs? He did not like the idea.

Mr. H. R. G. POATE referred to the advantages of the discussion. Elementary principles had received vindication. Fixation of the joints above and below the fracture was essential, and the splint should be made to fit the patient. The only splint that could fit the patient was the plaster splint. The days of the convex padding of splints was gone or should be gone. Dr. Royle had struck the essential note in regard to the cause of displacement. A fracture caused injury and damage to the muscles and as a result they were torn and lacerated. The limb thus lost its stability and the muscles made an effort to restore stability. If the fracture was satisfactorily reduced and kept so by appropriate means, the muscles would remain in the normal position of rest. He agreed with Dr. Corlette's remarks in regard to open reduction without the use of wire or plates. In reply to Mr. Thring he said that the question of medullary pegs was like a red rag to a bull to him. He could not find words strong enough to condemn the practice; it was a violation of elementary physiological principles. There might be some justification for the use of bone grafts in recent fractures, but the insertion of pegs was fundamentally wrong.

Dr. KEVIN BYRNE asked how far down the arm it was necessary to carry the plaster in order to obtain fixity of the lower end. He wanted to know whether if carried below the wrist this would not interfere with movements of the fingers. He wondered whether the muscles would waste and the splint consequently become loose if not carried below the wrist. How was one to guard against this?

Dr. R. B. WADE expressed the indebtedness of those present to the readers of papers. He thought that they had their reward in the interesting discussion which they had called forth. It was disappointing that at that stage of medical knowledge there should be such a diversity of opinion in regard to the subject. He thought that the reason lay in the fact that there were two schools looking at the question from different angles. The man associated with a large hospital had every facility for X ray examination and so forth and he looked at these fractures from the point of view of anatomical result. Those of the other school did not do so and took more heed of the functional result. Hospital surgeons should determine how much

anatomical disability was needed to produce functional disability. Overlapping was not necessarily associated with bad functional results. Sometimes too much effort was needed to get a perfect anatomical result, attempt after attempt was made and the frequent handling damaged the soft tissue with the result that greater loss of function occurred than if the original injury had been left alone.

Dr. Teece in reply said that every one recognized that a bad anatomical result could be associated with a good functional result. He held, however, that they should put this idea right at the back of their minds and strive for more perfect anatomical correction. Mr. Poate had voiced his opinion in regard to the use of intramedullary pegs. In regard to the three plaster method he was glad to hear that others had been more fortunate than he had. The French surgeons had been keen on it eight or nine years previously and British surgeons had tried it. He had followed the technique advocated by Dr. Royle and did not feel satisfied with it. In regard to plating fractures he had seen refracture occur twice five years after plating, the fracture had occurred in each instance through the screw holes. This was the vulnerable point. Kangaroo tendon could be used with advantage for it was absorbable. Colles's fracture should be the easiest to reduce even after some weeks. Bad results might follow. The disability, however, was due not solely to failure to reduce, but largely to too long immobilization.

Dr. Aspinall in reply said that he wished to explain the nature of cases in which he used silver wire. He referred as an example to a jockey who had been admitted to hospital with a severe compound fracture of both bones of the leg in their lower third. A large piece of skin had been missing from the popliteal space also at the site of fracture and the skin of the foot had been lacerated. He had twisted a piece of wire round both bones and had instituted Carrel-Dakin treatment. After eighteen months an excellent result had been obtained, so much so that the boy had wanted to ride again. The wire had caused no trouble and Dr. Aspinall had removed before the boy's discharge from hospital. The wire held the bones in position while the wound healed.

#### NOMINATIONS AND ELECTIONS.

THE undermentioned has been nominated for election as a member of the Queensland Branch of the British Medical Association:

Dart, John Leslie, M.B., 1925 (Univ. Sydney), Sandgate.

THE undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

Abbey-Wiesener, Frederick, M.B., Ch.M., 1923 (Univ. Sydney), 227, Macquarie Street, Sydney.

Blakemore, John Howell, M.B., Ch.M., 1924 (Univ. Sydney), Cooper Street, Strathfield.

Carroll, Herbert Buckworth, M.B., Ch.M., 1923 (Univ. Sydney), "Wyldfels," Merchant Street, Stanmore.

Conolly, William Arnold, M.B., Ch.M., 1925 (Univ. Sydney), St. John's Rectory, Gordon.

Crakanthorp, John Saxon, M.B., Ch.M., 1924 (Univ. Sydney), "Merriwa," Condamine Street, Manly.

Duncan, George Joseph, M.B., Ch.M., 1922 (Univ. Sydney), Royal Alexandra Hospital for Children, Camperdown.

Florance, Frederick Claude, M.B., 1924 (Univ. Sydney), Goodooga.

Jobbins, Leslie Thomas, M.B., Ch.M., 1924 (Univ. Sydney), Pomona, Queensland.

Prior, Guy Percival Underdown, L.R.C.P., 1898 (London), M.R.C.S., 1898 (England), L.S.A., 1895 (London), Mental Hospital, Rydalmere.

Rich, Harold Strathfield, L.R.C.P., 1925 (London), M.R.C.S., 1925 (England), "Kinnell," Elizabeth Bay Road, Elizabeth Bay.

Shipton, Eva Adeline, M.B., 1925 (Univ. Sydney), Parkes Street, Guildford.

### Correspondence.

#### THE CONTROL OF SURGEONS.

SIR: I have to thank Dr. Harold Crawford for his letter in your issue of June 16, 1925, but must deny his soft impeachment that I laid down a policy without defining how it was to be carried out.

The manner of carrying out the first and third suggestions must be obvious to everybody.

Dr. Crawford asks how a medical practitioner is to be hall marked as a surgeon.

As this question is exercising the minds of many of our leaders in the surgical world both in Australia and abroad, I felt sure that readers of the journal would be *au fait* with the question and I am sure that Dr. Crawford himself has many useful ideas on the subject.

Of course we were "hall marked" when we received our diplomas, but it is the character of the hall mark that is the point at issue.

Far from being obnoxious, criticism within the profession is surely indicative of a healthy spirit; it is difficult to see why Dr. Crawford thinks the criticism is directed especially against the general practitioner.

Unless we do improve conditions of surgical training the general public will one day wake up and demand that all who practise surgery, should have a technical training at least as good as that of a tradesman.

In the future the words bachelor of surgery on the diplomas of applicants for surgical positions will not be the "Open Sesame" they are at present and hospital committees will insist that the right to practise surgery will be more hardy earned.

In conclusion, I trust that we will be given the opportunity of discussing further these questions with Dr. Harold Crawford at the forthcoming post-graduate in Brisbane.

Yours, etc.,

E. S. MEYERS.

Vulture and Graham Streets, South Brisbane.

June 10, 1925.

### Proceedings of the Australian Medical Boards.

#### VICTORIA.

THE undermentioned have been registered under the provisions of *The Medical Act, 1915*, as duly qualified medical practitioners:

Ashton, John Gerard Arthur Winter, M.B., B.S., 1925 (Univ. Melbourne), Bishop's Holme, Grafton, New South Wales.

Daly, Thomas Joseph, M.B., B.S., 1925 (Univ. Melbourne), Ryanston Post Office, Dalyston.

Diamond, Louis Bernard, M.B., Ch.M., 1924 (Univ. Sydney), c/o Mr. L. Price, 124, Kooyong Road, Caulfield.

MacLeod, Annie Jubilee, M.B., B.S., 1925 (Univ. Melbourne), "Laluma," Ardmillan Road, Moonee Ponds.

#### Additional Diploma Registered.

Lee, Alan Edward, F.R.C.S., 1924 (England).

### Obituary.

#### RAY MERRYWEATHER.

It is with great regret that we have to announce the sudden death from *angina pectoris* of Dr. Ray Merryweather which took place in Perth on July 21, 1925.



## THE WILLIAM MACEWEN MEMORIAL FUND.

WE have received a contribution of one guinea toward the William Macewen Memorial Fund from Dr. Douglas Galbraith, of Brunswick, Melbourne. The fund stands at thirteen guineas.

## Books Received.

PRINCIPLES OF SURGERY FOR NURSES, by M. S. Woolf, M.A., B.Sc., M.R.C.S. (England), L.R.C.P. (London). 1925. Philadelphia and London: W. B. Saunders Company. Demy 8vo., pp. 350. Price: 15s.

THE PHYSIOLOGY OF THE MIND: AN INTERPRETATION BASED ON BIOLOGICAL, MORPHOLOGICAL, PHYSICAL AND CHEMICAL CONSIDERATIONS, by Francis X. Dercum, A.M., M.D., Ph.D. Second Edition, Reset. 1925. Philadelphia and London: W. B. Saunders Company. Post 8vo., pp. 287. Price: 17s. 6d.

CLINICAL BIOCHEMISTRY, by Ivan Maxwell, M.D., M.Sc. 1925. Melbourne: W. Ramsay. Demy 8vo., pp. 124. Price: 12s. 6d.

MEDICAL EDUCATION, A COMPARATIVE STUDY, by Abraham Flexner. 1925. New York: The MacMillan Company. Royal 8vo., pp. 343.

THE MEDICAL WHO'S WHO. Published Annually. 1925. London: Grafton Publishing Company Limited. Demy 8vo., pp. 829. Price: 30s.

THE PRACTICAL MEDICINE SERIES, COMPRISING EIGHT VOLUMES ON THE YEAR'S PROGRESS IN MEDICINE AND SURGERY: Under the General Editorial Charge of Charles L. Mix, A.M., M.D. Volume VII.: Dermatology and Syphilis, Edited by William Allen Pusey, A.M., M.D. and Francis Eugene Senear, B.S., M.D.; Urology, Edited by John H. Cunningham, M.D. 1925. Chicago: The Year Book Publishers. Crown 8vo., pp. 384. Price: \$2.

THE PRACTICAL MEDICINE SERIES, COMPRISING EIGHT VOLUMES ON THE YEAR'S PROGRESS IN MEDICINE AND SURGERY: Under the General Editorial Charge of Charles L. Mix, A.M., M.D. Volume VIII.: Nervous and Mental Diseases, Edited by Peter Bassoe, M.D. 1925. Chicago: The Year Book Publishers. Crown 8vo., pp. 357. Price: \$2.

TUMORS AND CANCERS: A BIOLOGICAL STUDY, by Hastings Gilford, F.R.C.S., with an introduction by Sir Frederick Keeble, C.B.E., Sc.D., F.R.S. 1925. London: Selwyn and Blount Limited. Royal 8vo., pp. ix. + 703.

## Medical Appointments.

Dr. William Gilfillan (B.M.A.) has been appointed Acting Deputy Superintendent at the Enfield Receiving House, South Australia.

Dr. Donald MacDonald Steele (B.M.A.) has been appointed Medical Officer of the Port Lincoln Hospital, South Australia.

Dr. Clarence Otto Ferris Rieger (B.M.A.) has been appointed Honorary Medical Officer of the Port Lincoln Hospital, South Australia.

Dr. Raphael Leo Kenihan (B.M.A.) has been appointed an Honorary Anaesthetist in the Adelaide Hospital, South Australia.

Dr. John Smith Proctor (B.M.A.) has been appointed an Official Visitor to the Mental Hospital at Parkside, South Australia.

## Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xvi.

LEONORA DISTRICT HOSPITAL, WESTERN AUSTRALIA: Resident Medical Officer.

THE UNIVERSITY OF MELBOURNE: Director of Obstetrical Research.

THE UNIVERSITY OF SYDNEY: Physicist to the Cancer Research Committee.

## Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C.

BRANCH.	APPOINTMENTS.
	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmmain United Friendly Societies' Dispensary.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney.	Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester United Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phoenix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association.
QUEENSLAND: Hon- orary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIAN: Honorary Secretary, 12, North Terrace, Adelaide.	Contract Practice Appointments at Renmark. Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

## Diary for the Month.

- AUG. 4.—Tasmanian Branch, B.M.A.: Council.  
AUG. 5.—Victorian Branch, B.M.A.: Branch.  
AUG. 6.—Section of Orthopaedics, New South Wales Branch, B.M.A.  
AUG. 7.—Queensland Branch, B.M.A.: Branch.  
AUG. 11.—Tasmanian Branch, B.M.A.: Branch.  
AUG. 11.—New South Wales Branch, B.M.A.: Ethics Committee.  
AUG. 13.—Victorian Branch, B.M.A.: Council.  
AUG. 13.—South Australian Branch, B.M.A.: Council.  
AUG. 13.—New South Wales Branch, B.M.A.: Clinical Meeting.  
AUG. 14.—Western Australian Branch, B.M.A.: Council.  
AUG. 14.—Queensland Branch, B.M.A.: Council.  
AUG. 18.—Tasmanian Branch, B.M.A.: Council.  
AUG. 18.—New South Wales Branch, B.M.A.: Executive and Finance Committee.  
AUG. 18.—Illawarra Suburbs Medical Association, New South Wales.  
AUG. 19.—Western Australian Branch, B.M.A.: Branch.  
AUG. 25.—New South Wales Branch, B.M.A.: Medical Politics Committee: Organization and Science Committee.  
AUG. 27.—New South Wales Branch, B.M.A.: Branch.  
AUG. 27.—South Australian Branch, B.M.A.: Branch.  
AUG. 28.—Queensland Branch, B.M.A.: Council.

## Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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